



DEPARTMENT OF THE ARMY  
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT  
600 ARMY PENTAGON  
WASHINGTON, DC 20310-0600

Reply to Attention Of:  
Army Base Realignment and Closure Division

JUL 08 2016

Mr. Bob Stroud  
U.S. Environmental Protection Agency, Region III  
701 Mapes Road  
Fort Meade, MD 20755

Subject: Draft Third Five-Year Recurring Review for the Base Realignment and Closure  
Property Remedy, Tipton Airport Parcel, Anne Arundel County, MD

Dear Mr. Stroud:

Please find enclosed one original and two copies of the Draft *Third Five-Year Recurring Review for Base Realignment and Closure Property, Tipton Airport Parcel, Anne Arundel County, MD* for your review and comment.

My point of contact for this action is Steve Cardon at (301) 677-9178 /  
[Steven.C.Cardon.ctr@mail.mil](mailto:Steven.C.Cardon.ctr@mail.mil) or I can be reached at (703) 545-2474 /  
[Markus.A.Craig.civ@mail.mil](mailto:Markus.A.Craig.civ@mail.mil)

Sincerely,

  
Markus A. Craig  
Program Manager

Enc: 1

cc:

Elisabeth Green (Maryland Department of the Environment) – 1 hardcopy w/ CD  
Andrea Graham (US Army Corps of Engineers) – 1 hardcopy w/ CD  
Michael Wassel (Tipton Airport Authority) – 1 hardcopy w/ CD  
Kerry Topovski (Anne Arundel County) – 2 CDs  
Steve Cardon (Fort Meade Legacy BRAC Environmental Office) – 1 hardcopy w/ CD

**Third Five Year Review**  
**Tipton Airfield Parcel**  
**Base Realignment and Closure Property Remedy**  
**Anne Arundel County, Maryland**

**Draft Document**



**Prepared by:**

**US Army Corps of Engineers  
Baltimore District**

**Prepared for:**

**Department of the Army  
Assistant Chief of Staff for Installation Management  
Base Realignment and Closure Division**



**July 2016**

## TABLE OF CONTENTS

LIST OF ACRONYMS .....	iv
EXECUTIVE SUMMARY .....	ES-1
FIVE YEAR REVIEW SUMMARY FORM .....	SF-1
1.0 INTRODUCTION .....	1-1
2.0 SITE CHRONOLOGY .....	2-1
3.0 BACKGROUND .....	3-1
3.1 Physical Characteristics .....	3-1
3.1.1 Site Geology and Topography.....	3-1
3.1.2 Surface Water Hydrology.....	3-2
3.1.3 Regional Hydrogeology .....	3-2
3.1.4 Tipton Airfield Parcel Local Hydrogeology .....	3-2
3.1.5 Inactive Landfill 1 .....	3-3
3.1.6 Inactive Landfill 2 .....	3-3
3.1.7 Inactive Landfill 3 .....	3-3
3.1.8 Fire Training Area .....	3-3
3.1.9 Helicopter Hangar Area .....	3-3
3.1.10 Little Patuxent River .....	3-4
3.2 Land and Resource Use .....	3-4
3.2.1 Inactive Landfill 1 .....	3-5
3.2.2 Inactive Landfill 2 .....	3-5
3.2.3 Inactive Landfill 3 .....	3-6
3.2.4 Fire Training Area .....	3-6
3.2.5 Helicopter Hangar Area .....	3-6
3.2.6 Little Patuxent River .....	3-7
3.3 History of Contamination .....	3-7
3.4 Initial Response.....	3-10
3.4.1 MEC Response.....	3-10
3.4.2 Chemical Contamination Response.....	3-11
3.5 Basis for Taking Action.....	3-11
4.0 REMEDIAL ACTIONS .....	4-1
4.1 Remedy Selection .....	4-1
4.2 Remedy Implementation.....	4-6
4.3 System Operations/O&M .....	4-7
5.0 PROGRESS SINCE LAST REVIEW .....	5-11
5.1 Protectiveness Statement from Last Review .....	5-11
5.2 Status of Recommendations and Follow-Up Actions from Last Review .....	5-11
5.2.1 Results of Implemented Follow-up Actions.....	5-14
5.2.2 Status of Incomplete Recommendations and Follow-up Actions .....	5-14
6.0 FIVE YEAR REVIEW PROCESS.....	6-1
6.1 Administrative Components .....	6-1

6.2	Community Notification and Involvement .....	6-2
6.3	Document Review.....	6-2
6.4	Data Review and Trends.....	6-3
	6.4.1 MCL Exceedances.....	6-3
	6.4.2 RSL Exceedances.....	6-3
	6.4.3 Groundwater Trends and Recommendations .....	6-8
6.5	Site Inspection.....	6-9
6.6	Interviews .....	6-10
7.0	TECHINICAL ASSESSMENT .....	7-11
	Question A.....	7-11
	Question B.....	7-11
	Question C.....	7-12
7.1	Technical Assessment Summary .....	7-12
8.0	ISSUES .....	8-1
9.0	RECOMMENDATIONS.....	9-1
10.0	PROTECTIVENESS STATEMENT .....	10-1
11.0	NEXT REVIEW .....	11-1

## LIST TABLES

Table 2-1:	Chronology of Site Events	2-1
Table 3-1:	History of Contamination for the TAP	3-9
Table 4-1:	Groundwater Monitoring Criteria for TAP Area Groundwater	4-3
Table 4-2	Summary of Affected Media and Selected Remedies for the TAP and LPR	4-4
Table 4-3	Summary of the LUCs Implemented at the TAP	4-6
Table 4-4	Monitoring Well Identification	4-7
Table 4-5	LTM Results for MEC at Little Patuxent River Since Last Five-Year Review	4-9
Table 4-6	Long-Term Groundwater Monitoring Costs for the TAP	4-10
Table 4-7:	LTM Costs for Annual LPR MEC Sweeps and Landfill Inspections	4-10
Table 5-1:	Status of the Second (2011) Five-Year Review Report Recommendations	5-12
Table 6-1:	Review Team Members	6-1
Table 6-2:	Stakeholder Points of Contact	6-2
Table 6-3:	History of Organic Analyte Exceedances at the TAP	6-5
Table 6-4:	History of Inorganic Analyte Exceedances at the TAP	6-6



## **LIST OF APPENDICES**

Appendix A	Community Notification
Appendix B	References
Appendix C	Memorandum for Record of Site Visit and Photographs, May 8, 2015
Appendix D	Site Inspection Checklist and Interview Record
Appendix E	Figures
Appendix F	Tables

## LIST OF ACRONYMS

BRAC	Base Realignment and Closure
BRACD	Base Realignment and Closure Division (now DAIM-ODB)
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COPC	Chemical of Potential Concern
DCE	Dichloroethene
DD	Decision Document
DoD	Department of Defense
DOI	Department of the Interior
DAIM-ODB	Department of the Army, Installation Management, Operations Directorate/Base Realignment and Closure Division
EA	EA Engineering, Science, and Technology, Inc.
EOD	Explosive Ordnance Disposal
ESD	Explanation of Significant Difference
FGGM	Fort George G. Meade
FS	Feasibility Study
FTA	Fire Training Area
GW	Groundwater
HHA	Helicopter Hangar Area
HHRA	Human Health Risk Assessment
HI	Hazard Index
IAL	Inactive Landfill
LOD	Limit of Detection
LPR	Little Patuxent River
LTGM	Long-Term Groundwater Monitoring
LTM	Long-Term Monitoring

## **LIST OF ACRONYMS (continued)**

LUCs	Land Use Controls
LUCIP	Land Use Control Implementation Plan
LUC RD	Land Use Control Remedial Design
µg/L	microgram per liter
MCL	Maximum Contaminant Level
MCLGs	Maximum Contaminant Level Goals
MDE	Maryland Department of the Environment
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
MW	Monitoring Well
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
NPL	National Priority List
NTCOE	Non-Time Critical Ordnance and Explosives
OE	Ordnance and Explosives
PAH	Polycyclic Aromatic Hydrocarbons
PFC	Polyfluorinated Chemical
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctyl Sulfonates
PRG	Preliminary Remediation Goal
PRR	Patuxent Research Refuge
PRR-NT	Patuxent Research Refuge-North Tract
QAPP	Quality Assurance Project Plan
RAB	Restoration Advisory Board
RAOs	Remedial Action Objectives

## **LIST OF ACRONYMS (continued)**

RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RG	Remediation Goal
ROD	Record of Decision
RSL	USEPA Region 3 Regional Screening Level
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SL	Screening Level
SVOC	Semi-Volatile Organic Compound
TAP	Tipton Airfield Parcel
TRV	Toxicity Reference Value
UU/UE	Unlimited Use and Unrestricted Exposure
URS	URS Group, Inc.
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center (now U.S. Army Environmental Command)
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
WP	White Phosphorous

**THIRD FIVE YEAR REVIEW, DRAFT**  
**TIPTON AIRFIELD PARCEL**  
**FORT MEADE. BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY**  
**LAUREL. MARYLAND**

**EXECUTIVE SUMMARY**

The Tipton Airfield Parcel (TAP) is located on property formerly part of Fort George G. Meade (FGGM) located in Anne Arundel County, MD. The TAP was excessed under the Base Realignment and Closure (BRAC) Act of 1988 (Public Law 100-526, 102 Stat. 2623) to Anne Arundel County Tipton Airport Authority for use for use as a small municipal airfield for light fixed wing and rotary wing aircraft. The TAP is comprised of three Inactive Landfills (IAL), the Tipton Airfield, the former Helicopter Hangar Area (HHA), the former Fire Training Area (FTA), and the Little Patuxent River (LPR). The airfield infrastructure and adjacent areas cover approximately 346 acres. Inactive Landfill 1 (IAL1) covers approximately 8 acres and is located in the north-central portion of the TAP between the LPR and Bald Eagle Drive (Figures 1 and 2). Inactive Landfill 2 (IAL2) is located within the TAP parcel on approximately 10 acres of land north of Wildlife Loop Road, approximately 450 feet north and east of the LPR. The IAL2 was part of the TAP, but was excised from the legal description of the BRAC property and is currently retained by the Army. Inactive Landfill 3 (IAL3) covers approximately 78 acres and is within the eastern portion of the airplane runway area. Tipton Airfield consists of four hangars, an operations building, a fire station, taxiways and runway, and a helicopter training area. The HHA is located at the northwest corner of the airfield, adjacent to the Little Patuxent River. The FTA is located off Airfield Road and is north of the airfield and east of the HHA. Use of the TAP property as a former military range has been documented as far back as the early 1920s.

Fort Meade was listed on the National Priorities List (NPL) on July 28, 1998, using U.S. Environmental Protection Agency (USEPA) identification number MD0910020567.

Following the NPL listing, two Records of Decision (RODs) were issued by the Army and the USEPA and were agreed upon by the Maryland Department of the Environment (MDE) to select remedial actions for the evaluation areas at the TAP. The December 1998 ROD for the Tipton Airfield Area Operable Unit specified No Further Action (NFA) for the FTA, HHA, and IAL3 and was signed 30 December 1998. The July 1999 ROD for the Tipton Airfield Parcel Operable Unit specified NFA with groundwater (GW) monitoring for Inactive Landfills 1 and 2 and the entire TAP GW and was signed 20 July 1999. Figures 1, 2 and 4 show the five environmental areas at



TAP, the monitoring wells and groundwater elevation contours. The 1998 ROD does not provide soil RAOs, and the 1999 ROD does not provide ground RAOs, because both selected remedies are NFA.

In order to include the December 1998 ROD and the July 1999 ROD into the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedy, the Army and USEPA issued an Explanation of Significant Difference (ESD) in May 2014. The ESD amended the remedy to add implementation of LUCs to prevent human exposure to MEC and contaminated groundwater and modifies the RODs to clearly document: (1) the need for sweeps of ordnance; (2) appropriate disposal of ordnance if discovered; and (3) land use control (LUC) requirements (URS, 2014b).

The ESD also specified periodic sweeps of ordnance for IAL3 and for an approximate one-mile long stretch of the LPR. Surface sweeps for Munitions of Explosive Concern (MEC) at IAL3 were originally required as part of a July 1998 DD. The ESD currently requires surface sweeps for MEC on IAL3 every five years, and includes continued annual MEC sweeps of the LPR.

Furthermore, the ESD requires that groundwater monitoring continue until contaminant levels are below the Maximum Contaminant Levels (MCLs) or in their absence, USEPA Region 3 Screening Levels (RSLs), as specified by the TAP LTGM program.

As a result of the ESD, a Land Use Control Remedial Design (LUCRD) was submitted in June 2015 which documents the required LUCs for the TAP. Groundwater LUCs include: restrictions to prevent use of TAP groundwater with the exception for its use in environmental studies until contaminants in GW allow for unlimited use and unrestricted exposure (UU/UE); prohibition of residential use until such time as an evaluation of residential exposure risks indicates no unacceptable risk to human health; prohibition of excavation or other disturbance of surface or subsurface soils, with the exception of the emergency repair of existing utilities, without written approval of the Army. MEC LUCs include: prohibition of excavation or other disturbance of surface or subsurface soils, with the exception of the emergency repair of existing utilities, without written approval of the Army; maintenance of site security around IAL2 including periodic inspections and repair of fence damage; surface sweeps for MEC at IAL 3 every 5 years (next sweep scheduled for 2016); inform airfield personnel of subsurface dig restrictions and provide technical advice as needed.

This Five-Year Review evaluates the remedy selected by the Army and USEPA for TAP. The TAP was transferred; however, the Army remains responsible for implementing, maintaining, reporting on, and enforcing the LUCs at the TAP. Although Anne Arundel County Tipton Airport

Authority owns the TAP property, the Army still remains responsible for any contamination which was generated as a result of historical Army use of the property, and all associated decontamination, cleanup, and remedial action that may be required.

The USEPA Operable Units (OUs) at the TAP are delineated as follows:

1. Tipton Airfield Area (TAA) USEPA OU-17 consisting of the FTA, HHA and IAL3, as established via the December 1998 ROD and modified by the May 2014 ESD;
2. Tipton Airfield Parcel (TAP) USEPA OU-08 consisting of IAL1, IAL2 and the entire TAP GW as established via June 1999 ROD and modified by the May 2014 ESD;
3. Little Patuxent River (LPR) MEC USEPA OU-35, consisting of the LPR MEC sweep established via the May 2014 ESD.

The TAA USEPA OU-17 remedy is protective of human health and the environment. The TAP USEPA OU-08 remedy is protective of human health and the environment. The LPR MEC USEPA OU-35 remedy is protective of human health and the environment. Because the remedial actions at all OUs are protective, the site is protective of human health and the environment.

The remedy at TAP is protective of human health and the environment. The elements of the remedy, (1) LUCs, (2) groundwater LTM and (3) periodic MEC inspections protect the public from exposure to contaminated groundwater and MEC.

The effective implementation of LUCs has prevented extraction of groundwater except for its allowable use for environmental sampling. There is no residential development at TAP. There has been no excavation at the site without proper receipt of permission from the Army. There have been no activities that would interfere with the site remedy.

## FIVE YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
<b>Site Name:</b> Tipton Airfield Parcel (TAP)		
<b>EPA ID:</b> MD0910020567		
<b>Region:</b> 3	<b>State:</b> MD	<b>City/County:</b> Odenton/Anne Arundel County
SITE STATUS		
<b>NPL Status:</b> Deleted		
<b>Multiple OUs?</b> Yes	<b>Has the site achieved construction completion?</b> Yes	
REVIEW STATUS		
<b>Lead agency:</b> IMCOM and BRAC <a href="#">Click here to enter text.</a>		
<b>Author name:</b> U.S. Army Corps of Engineers		
<b>Author affiliation:</b> Baltimore District Office		
<b>Review period:</b> May 2015– March 2016		
<b>Date of site inspection:</b> May 8, 2015		
<b>Type of review:</b> Statutory		
<b>Review number:</b> 3		
<b>Triggering action date:</b> 9/23/2011		
<b>Due date:</b> 9/23/2016		

## FIVE YEAR REVIEW SUMMARY FORM (continued)

Issues/Recommendations		
<b>OU(s) without Issues/Recommendations Identified in the Five-Year Review:</b>		
Tipton Airfield Area USEPA OU-17 (Inactive Landfill 3, Helicopter Hanger Area, Fire Training Area), Tipton Airfield Parcel USEPA OU-08 (IAL1, IAL2, TAP area groundwater), Little Patuxent River USEPA OU		
Protectiveness Statement(s)		
<i>Operable Unit:</i> Tipton Airfield Area USEPA OU-17 (HHA, FTA, IAL3)	<i>Protectiveness Determination:</i> Protective	<i>Addendum Due Date:</i> NA
<i>Protectiveness Statement:</i> The remedy at Tipton Airfield Area USEPA OU-17 is protective of human health and the environment.		
<i>Operable Unit:</i> Tipton Airfield Parcel USEPA OU-08 (IAL1, IAL2, TAP area groundwater)	<i>Protectiveness Determination:</i> Protective	<i>Addendum Due Date :</i> NA
<i>Protectiveness Statement:</i> The remedy at Tipton Airfield Parcel USEPA OU-08 is protective of human health and the environment.		
<i>Operable Unit:</i> Little Patuxent River MEC USEPA OU-35	<i>Protectiveness Determination:</i> Protective	<i>Addendum Due Date :</i> NA
<i>Protectiveness Statement:</i> The remedy at Little Patuxent River MEC USEPA OU-35 is protective of human health and the environment.		
Sitewide Protectiveness Statement		
<i>Protectiveness Determination:</i> Protective		<i>Addendum Due Date (if applicable):</i> N/A
<i>Protectiveness Statement:</i> Because the remedial actions at all OUs are protective, the site is protective of human health and the environment.		





## 1.0 INTRODUCTION

This Five-Year Review evaluates the remedy for the Tipton Airfield Parcel (TAP) located in Anne Arundel County, MD. With respect to this Five-Year Review, the TAP includes: three Inactive Landfills (Inactive Landfill 1 (IAL1), Inactive Landfill 2 (IAL2), and Inactive Landfill 3 (IAL3)), the Helicopter Hangar Area (HHA), the Fire Training Area (FTA), the entire TAP groundwater and an approximately one-mile stretch of the Little Patuxent River (LPR). The TAP is located on property formerly part of Fort George G. Meade (FGGM) and it covers approximately 346 acres.

The purpose of a Five-Year Review is to determine whether the remedy at a site is protective of human health and the environment. For the TAP, the Five-Year Review is required because Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), requires that remedial actions which result in any hazardous substances, pollutants, or contaminants remaining at the site be subject to a Five-Year review. This is the third Five-Year Review for the TAP. Previous Five-Year Reviews were conducted in 2006 and 2011.

The Army, as the Lead Agency, is preparing this Five-Year Review pursuant to the CERCLA §121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

CERCLA §121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The USEPA interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii):

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

This Five-Year Review follows the *Comprehensive Five-Year Review Guidance* (EPA 2001) and its updates. The U.S. Army Corps of Engineers, Baltimore District (USACE) performed this Five-Year Review to evaluate the implementation and performance of the site remedy to determine if it remains protective of human health and the environment. USACE reviewed pertinent documents, conducted interviews with individuals knowledgeable of the site, and conducted a site visit. The

methods, findings and conclusions of the review are documented in this report, along with any issues or concerns identified and recommendations to address these issues or concerns. This Five-Year Review is due for completion by 23 September 2016, based on USEPA's concurrence letter to the previous Five-Year Review dated 23 September 2011.

This Five-Year Review consists of an evaluation of three OUs, described below.

1. Tipton Airfield Area (TAA) USEPA OU-17 – FTA, HHA and IAL3 – Periodic munitions and explosives of concern (MEC) surface sweeps are required for IAL3, currently every five years, as well as annual inspections of the condition of IAL3. Land Use Controls (LUCs) restrict excavation or other disturbance of surface or subsurface soils, and prohibit the use of groundwater except for environmental studies.
2. Tipton Airfield Parcel (TAP) USEPA OU-08 – IAL1, IAL2 and the entire TAP GW – Periodic inspections of IAL1 and IAL2 are required, which for IAL2 includes the requirement to inspect and maintain security measures (fencing) restricting unauthorized access. LUCs restrict excavation or other disturbance of surface or subsurface soils, and prohibit the use of groundwater except for environmental studies
3. LPR MEC USEPA OU-17 – Periodic (annual) MEC sweeps of about one-mile of river between the Old Forge Bridge to a point 400ft south of Maryland Highway 198, incorporating approximately 8 acres of the river and riverbanks. This includes appropriate disposal of ordnance, if discovered.

In addition to these three OUs on the TAP, the remainder of the approximately 346 acres is an active municipal airfield for light fixed-wing and rotary wing aircraft. The Tipton Airport is operated by the Tipton Airport Authority, a state-chartered public corporation.

## 2.0 SITE CHRONOLOGY

Table 2-1, Site Chronology, provides a history of key site events that have occurred at the TAP.

**Table 2-1: Chronology of Site Events**

<b><u>Active Site Use</u></b>	<b>Date</b>
<b><u>TAP as active range/training area</u></b>	Early 1920s to 1950s
<b><u>TAP Evaluation Areas</u></b> Inactive Landfill 1 (unlined sanitary landfill) Inactive Landfill 2 (soil borrow area and unlined rubble disposal area) Inactive Landfill 3 (soil borrow area and sanitary and leaf-dump landfill) Fire Training Area (fire training area) Helicopter Hangar Area (helicopter maintenance) Little Patuxent River	<b><u>Periods of Operation</u></b> 1950 to 1964 1938 to 1986 Late 1940s to 1963 1979 to 1998 Early 1980s to 1996 Impacted by range and training activities
<b>Event</b>	
<b>Tipton Airfield Construction Completed</b> , including removal and disposal of much of IAL3 fill material.	1963
<b>Enhanced PA Report</b> identifies the TAP Evaluation Areas.	October 1989
<b>Site Inspection (SI) Study</b> addressed all 5 Evaluation Areas at the TAP.	October 1992
<b>SI Study Addendum</b> – Fire Training Area, Helicopter Hangar Area, and Inactive Landfill 2 of the TAP were addressed.	1994
<b>Construction Specifications, Fire Training Area Demolition, Landfill Capping Projects</b>	January 26, 1996
<b>Final RI Report</b> for Inactive Landfill 1, Inactive Landfill 2, Inactive Landfill 3, and Clean Fill Dump were completed.	August 1998
<b>Final RI Report</b> for Helicopter Hangar Area and Fire Training Area was completed.	October 1998
<b>Fire Training Area Removal Action Report</b> was issued.	October 28, 1998
<b>Final Proposed Plan</b> for the Helicopter Hangar Area, Fire Training Area, and Inactive Landfill 3 was issued.	November 1, 1998
<b>ROD for Tipton Airfield Area OU</b> which addressed Helicopter Hangar Area, Fire Training Area, and Inactive Landfill 3 issued.	December 30, 1998
<b>Helicopter Hangar Area Removal Action Report</b> was issued.	March 19, 1999
<b>Proposed Plan</b> for Tipton Airfield Parcel OU; Inactive Landfill 1, Inactive Landfill 2 and Tipton GW was issued.	April 1999
<b>ROD for Tipton Airfield Parcel OU</b> for Inactive Landfill 1, Inactive Landfill 2, and Tipton GW was issued.	July 20, 1999
<b>First 5-Year Review Report</b> was submitted	March 2005
<b>Second 5-Year Review Report, Final</b>	September 23 2011

<b>2013 Land Use Control Remedial Design (Internal Draft)</b>	December 2013
<b>2014 Explanation of Significant Difference Report, Final</b>	May 8, 2014
<b>2014 Final Maintenance and Repair Completion Report for Inactive Landfill 1 and Inactive Landfill 3</b>	November 17, 2014
<b>Land Use Events</b>	<b>Date</b>
<b>Defense Authorization Amendments and Base Realignment and Closure Act (BRAC) of 1988</b> mandated the closure of 9,000 acres of the FGGM's original 13,670 acres.	1988
<b>Maryland Department of Natural Resources Evaluation of Surplus Property</b> delineated the natural features and land uses of the 9,000 acres BRAC parcel.	January 1990
<b>1991 Military Construction Appropriations Act</b> directed the transfer of 7,600 acres of the 9,000 acres (BRAC parcel) to the Department of the Interior (DOI) for inclusion in the Patuxent Research Refuge (PRR).	October 16, 1991
<b>DOI 1992 Transfer Assembly</b> , 498.2 acres transferred to DOI	November 17, 1992
<b>Decision Document, Safety Precautions to be Taken at Tipton Airfield</b> documents the approval of the proposed safety actions taken by the Army for Inactive Landfill 1, Inactive Landfill 2, and Inactive Landfill 3.	July 9, 1998
FGGM was formally added to the USEPA's <b>Final National Priorities List</b>	July 28, 1998
<b>Decision Document Addendum, Safety Precautions to be Taken at Tipton Airfield</b> further clarifies the institutional controls to include the prohibition of the use of groundwater at the TAP.	November 6, 1998
<b>EPA</b> submitted a <b>Notice of Intent</b> to delete Tipton Army Airfield from the NPL and Request for Comments.	September 1, 1999
<b>Finding of Suitability to Transfer (FOST)</b> documented the environmental conditions of the TAP for the land transfer to Anne Arundel County, MD.	October 1999
State of Maryland – <b>Quitclaim Deed</b> for Surplus Airfield Property, transferred TAP to Tipton Airport Authority	July 2001
<b>Long Term Groundwater Monitoring (LTGM) Events</b>	<b>Date</b>
<b>LTGM Plan</b>	June 2001
Final Combined Groundwater (GW) Operable Units (OUs) LTM Work Plan	March 2012
Work Plan Addendum for Combined GW OUs LTM	October 2014
Final Amendment to the Work Plan Addendum for Combined Groundwater OUs	May 2015
<b>MEC Events</b>	<b>Date</b>
<b>Ordnance Survey (1,400 Acre Parcel)</b>	Feb 1992 – June 1993
An <b>Ordnance and Explosives (OE) removal action</b> – Tipton Airfield, Helicopter Hangar Area, and Fire Training Area.	1996
<b>BRAC Parcel, Unexploded Ordnance Survey and Data Analysis</b>	June 1997

A <b>3-ft thick earthen MEC Safety Cover</b> was installed at Inactive Landfill 1.	August 1998 – October 1999
Annual <b>Non-Time Critical OE (NTCOE) Removal Action Report</b> for Little Patuxent River and Tipton Airfield, Inactive Landfill 3, Sweep 2001, documents MEC sweep, removal of items and proper disposal of ordnance related items.	January 2002
USACE performed an <b>Ordnance Sweep</b> at Inactive Landfill 3	March 30, 2006
USACE performed an <b>Ordnance Sweep</b> at Inactive Landfill 3 and Ball Field	May 5-6, 2011
Annual <b>NTCOE Removal Action Long Term Monitoring (LTM) Report</b> , Little Patuxent River Sweeps, 2002-2015	2002-2015



### **3.0 BACKGROUND**

#### **3.1 Physical Characteristics**

FGGM formerly occupied 13,596 acres of land in the northwest corner of Anne Arundel County, MD, approximately halfway between Washington, D.C. and Baltimore, MD. Figure 1 illustrates the regional location of FGGM with respect to the Baltimore-Washington metropolitan area. It also shows the BRAC parcel, which includes the TAP, and the Patuxent Research Refuge-North Tract (PRR-NT).

The TAP is located southeast of State Route 198 and south of Highway 32. Baltimore-Washington Parkway is to the west and the Little Patuxent River runs thru the west portion of the TAP and then to the south. The TAP occupies approximately 346 acres. Several areas were identified in 1989 that required environmental investigation (evaluation areas): IAL1, IAL2, IAL3, FTA and HHA. Figure 3 illustrates the geologic cross sections in the vicinity of TAP. Figure 4 illustrates the 2014 shallow groundwater elevations and contours, as well as the evaluation areas within the TAP. The shallow groundwater flow in the TAP is west/southwest towards the Little Patuxent River. The evaluation areas are described further below.

Figure 5 shows the MEC sweep location associated with the LPR which runs through the west portion and south of the TAP. The Army currently conducts annual MEC sweeps along an approximately one-mile stretch of the river as shown on this figure. The TAP and the LPR are located within the fans of two former military ranges and are considered artillery impact areas. The MEC sweeps for the LPR are summarized in this Five-Year Review.

##### **3.1.1 Site Geology and Topography**

The FGGM-BRAC area (including the PRR-NT and TAP) are located just within the western boundary of the Coastal Plain physiographic province (Coastal Plain). The Coastal Plain geology is characterized by a wedge of unconsolidated Cretaceous and Quaternary alluvial sediments (unconsolidated sands, silts, and clays) that dip and thicken toward the Atlantic Ocean. Underlying the Coastal Plain deposits is Precambrian crystalline bedrock composed predominately of gabbro, gneiss, and schist (Kaiser, August 1998).

The general topography is characterized by flat land that gently slopes towards a few water bodies throughout the area. The surface elevation ranges from approximately 90 feet to 180 feet, measured using the North American Vertical Datum of 1988 (NAVD 88). The lowest elevation (90 feet) occurs within the Little Patuxent River whereas the highest elevation (180 feet) occurs on the northern boundary of the TAP near State Route 32. The majority of the site topography, which has been modified to accommodate the airfield, slopes gently to the west or south.

### **3.1.2 Surface Water Hydrology**

TAP and the PRR-NT lie within the 932-square-mile Patuxent River watershed, one of the primary drainage systems in Anne Arundel County (IT Corp. 2002). Several surface water bodies are present within the refuge, including the Patuxent and Little Patuxent Rivers, Midway and Franklin Branches, and Lake Allen (formerly known as Soldier Lake). The Patuxent River receives drainage from numerous intermittent streams that emerge from both the TAP and the PRR-NT.

Runoff originating within the perimeter portions of the TAP is conveyed by drainages west or south to tributaries or drainages of the Little Patuxent River. Runoff from the central portion of the area flows into a storm water collection and conveyance system beneath the airfield, which discharges via French drains to the Little Patuxent River or its drainages (EA, 2015b).

The LPR, north of the Old Forge Bridge, is designated as State of Maryland waterbody Use Class I-P, which is suitable for water contact recreation, protection of aquatic life and as a public water supply. The surface water intake for the FGGM Water Treatment Plant was located north of Route 198, near to, but upstream of, the Highway 198 bridge, however FGGM no longer uses water from the LPR.

### **3.1.3 Regional Hydrogeology**

Groundwater resources in the Potomac Group sediments include three aquifers: the Upper Patapsco, the Lower Patapsco, and the Patuxent (URS 2005a). The Arundel Formation and the middle confining layer of the Patapsco Formation (Middle Patapsco), act as confining layers separating the aquifers. The aquifers are confined on a regional scale, but they act as unconfined aquifers within the respective outcrop areas.

Within this area, FGGM obtains water from six deep production wells, PW-1 to PW-6. Each of these deep wells is screened from between 500 to 800 ft bgs in the Patuxent Formation. Two of the wells are located on the FGGM Cantonment area north of State Route 32 and four of these wells are to the extreme eastern side of the PRR-NT. These deep wells are screened well below the thick Arundel Clay regional confining layer, which consists of stiff, reddish-brown clays with a thickness of 200 to 250 ft. (Kaiser, 1998a)

### **3.1.4 Tipton Airfield Parcel Local Hydrogeology**

At the TAP, the water table is present generally at depths less than 15 ft bgs, within the lower Patapsco Formation. The water table aquifer has a maximum saturated thickness of approximately 25 ft in this area. Unconfined groundwater flow is controlled by local topography, and flow is generally toward the Little Patuxent River (Figure 4). The Arundel Clay acts as a regional confining

layer below the Patapsco Aquifer. However, groundwater is also locally found in confined or semi-confined sand lenses within the upper portions of the Arundel Clay (Figure 3). The Chesapeake Bay drainage controls the southeastward groundwater flow in the Patuxent Formation (EA, 2015b).

### **3.1.5 Inactive Landfill 1**

The IAL1 covers approximately 8 acres and is located in the western portion of the TAP between the Little Patuxent River and Bald Eagle Drive. The IAL1 is considered part of the TAP, although it is physically separated from the airfield by the Little Patuxent River. A small concrete blockhouse, formerly used as a communications building, is present on the northwest corner of the area.

### **3.1.6 Inactive Landfill 2**

The IAL2 is located in the southwestern portion of the TAP on approximately 10 acres of land north of Wildlife Loop Road, and approximately 450-feet north and 1000-feet east of the Little Patuxent River. The IAL2 was part of the Tipton Army Airfield but was excised from the legal description of the BRAC property and has been retained by the Army. An estimated 3,500 feet-long perimeter fence encloses the 20-acre area, including the 10-acre landfill and a pond/wetland area along the northern fence boundary. The Tipton Airfield and the PRR-NT border the landfill. The approximate extent of IAL2 is indicated on Figure 2. No buildings or structures are present at IAL2.

### **3.1.7 Inactive Landfill 3**

The IAL3 covers approximately 78 acres and is within the eastern portion of the airplane runway area. The approximate extent of IAL3 is indicated on Figure 2. The airfield consists of four hangars, an operations building, a fire station, taxiways and runway, and a helicopter training area. A stormwater management system exists under the airfield.

### **3.1.8 Fire Training Area**

The FTA is located north of Airfield Road and is about 800 feet east of the HHA (Figure 2). The FTA covers approximately 2 acres. The northern half of the FTA is fenced off, enclosing the former fire training pit and adjacent training areas. The FTA is flat and sparsely vegetated with grass.

### **3.1.9 Helicopter Hangar Area**

The HHA includes Building 90 (the Helicopter Hangar) and adjacent areas located at the northwest corner of the airfield. The approximate extent of the HHA is indicated in Figure 2. The HHA is roughly bounded by the Little Patuxent River to the west, an unnamed tributary of the

Little Patuxent River to the north, Patuxent Road to the east, and the former helicopter parking area to the south. The HHA is located approximately 800 feet west of the FTA and covers approximately 5 acres. The HHA is surrounded by a chain-link fence that secures the site from both the LPR and Patuxent Road.

#### **3.1.10 Little Patuxent River**

The LPR is located near the western border of the TAP and flows from the northwest to the southeast. State-listed endangered species are present in this area. A nature trail parallels certain sections of the river. The Patuxent Research Refuge has maintained diverse habitats in this river bottomland; wetlands and marsh areas are present along the river and the tributary streams. Although LPR was not identified as a TAP Evaluation Area in the two site RODs, the ESD identifies it as a concern for MEC and it requires periodic MEC sweeps, along with appropriate disposal of discovered MEC.

The PRR-NT does not allow swimming, boating, fishing, or other recreational use of the LPR. The Army has constructed a fence along a portion of the river to discourage access to the river; signs that warn about potential MEC exposure are posted along the river. The PRR-NT management maintains some of the former military roads for access, but other roads were allowed to return to natural conditions.

### **3.2 Land and Resource Use**

The TAP, formerly known as Tipton Army Airfield, is located in the north-central portion of the BRAC parcel. The land use for the TAP as an airfield for light fixed wing and rotary wing aircraft is not likely to change in the future. The 2009 Anne Arundel County General Development Plan that was approved on October 19, 2009 by the County Council under Bill No. 64-09 states that over one hundred aircraft are based at the TAP; the airport handles approximately 150 aircraft arrival/departures daily. In the future, the county hopes to extend the length of the 3,000-foot runway to 4,000 feet and increase the amount of hangar space to accommodate larger turboprop aircraft. The county hopes to improve accessibility to the airport (Anne Arundel County, 2009).

The TAP was transferred to the Tipton Airport Authority; however, the Army remains responsible for implementing, maintaining, reporting on, and enforcing the LUCs at the TAP. Even though the Tipton Airport Authority currently owns the TAP property, the Army still remains responsible for any contamination which was generated as a result of their historical use of the property, and all associated decontamination, cleanup, and remedial action that may be required. The Army has authority and control over the management of the property with respect to conducting cleanup and remediation activities relating to the environmental restoration of the property.

All of the area within the TAP have a history of use as a military range as far back as the early 1920s. In Special Military Maps from 1923, the area which was later designated as Tipton Airfield, was identified as an artillery impact area. A 1941 South Cantonment Map shows that two ranges were located within the future Tipton area. One was an anti-tank range and the other was an anti-aircraft range. In the summer of 1942, 60mm and 81mm mortars were used in this area for target practice. During the same timeframe, live high-explosive shells were fired over the heads of troops for training purposes.

### **3.2.1 Inactive Landfill 1**

According to the Enhanced Preliminary Assessment (PA) report (USAEC, 1989), IAL1 was used as an unlined sanitary landfill from approximately 1950 to 1964. The earliest known aerial photograph (1938) shows the IAL1 area as a cultivated field. In subsequent aerial photographs from 1943, 1952, and 1957, IAL1 appears as an open clearing or training area, with no evidence of ground scarring or landfill activity. Landfill activities were first indicated in aerial photographs from 1963, which show barren areas and what appears to be trenches, probable debris, and mounded material presumably associated with landfill activities (USEPA, 1990). Aerial photographs from 1970 on show the area as inactive. The 1963 tree line, which appears to correspond to the maximum extent of man-made activities, persists to the present. Areas of mounded materials located on the north side of IAL1, which were first observed on the 1970 photographs, also persist to the present.

Although IAL1 is physically separated from the airfield by the Little Patuxent River, it is part of the TAP. As with the other areas of the TAP, it is anticipated that the land use for IAL1 will not change from its current use as a buffer area adjacent to the municipal airport and the PRR-NT.

### **3.2.2 Inactive Landfill 2**

Historical aerial photographs of IAL2, compiled by USEPA, indicate that IAL2 was initially operated as a soil borrow area (USACE, 2001) based on the appearance of large active excavations in aerial photographs from 1938 and 1943. By 1952, the borrow area was mostly overgrown. According to the *Enhanced Preliminary Assessment* (USACE, 1989), the area was subsequently operated as an unlined rubble disposal area. In 1957 and 1963, mounded materials and probable fill material were apparent at its maximum extent in the southern portion of the area. IAL2 was used sparingly between the years 1963 and 1970, where aerial photographs indicate the area being increasingly revegetated. A single north-northwest trending trench is reported visible along the east side of the access road in 1970 (USEPA cited in USACE, 2001). Continued disposal activity occurred after 1980 in the northern portion of IAL2 where graded and disturbed areas are visible in



1986.

As with other areas of the TAP, it is anticipated that the land use for IAL2 will not change from its current use as a buffer area adjacent to the municipal airport and the PRR-NT.

### **3.2.3 Inactive Landfill 3**

According to the *Enhanced Preliminary Assessment* (USACE, 1989), IAL3 was initially used as a sand borrow area. During the late 1940s and 1950s, the area was used as a sanitary and leaf-dump landfill. The Tipton Army Airfield was constructed over the fill area in 1963. The airfield consists of four hangars, an operations building, a fire station, taxiways and runway, and a helicopter hangar area. A storm water management system exists under the airfield (USACE, 2002), and it discharges through French drains to the LPR, or its drainages.

The site history indicates that the main disposal area was under what is now the eastern portion of the runway area. According to the *Enhanced Preliminary Assessment* (USACE, 1989), much of IAL3 was excavated and the materials were disposed of off-post during construction of the Tipton Airfield in 1963. This excavation and disposal of landfilled materials was done for all runway construction areas for structural reasons. However, landfilled materials are still present beneath areas adjacent to the runways. As with the other areas of the TAP, the land use for IAL3 will not change from its current use in support of the active municipal airport.

### **3.2.4 Fire Training Area**

The northern half of the FTA is fenced off, enclosing the former fire training pit and adjacent training areas. The area was constructed around 1979 for training purposes by the Fort Meade Fire Department. Other emergency response training, such as self-contained breathing apparatus training and emergency rescues, were also performed here.

The FTA is flat and sparsely vegetated with grass. A drainage swale and culvert were located parallel to the gate that drained to the wetlands/forested area just west of the FTA. The fire training pit was constructed of a concrete berm about one-foot-high and twenty feet in diameter, which was surrounded by a concrete apron. An oil-water separator located on the south side of the fire-training pit was used in draining the pit. Water from the separator was transported from the site via an underground pipeline to a sanitary sewer. Both the fire-training pit and the oil-water separator were removed in 1998 (USACE, 2002). As with the other areas of the TAP, it is anticipated that the land use for the FTA will not change from its current use as part of the municipal airport.

### **3.2.5 Helicopter Hangar Area**

The Helicopter Hangar (Building 90) and associated structures were constructed in the early 1980s. The HHA is surrounded by a chain-link fence that secures the site from both the river and Patuxent Road.

During operations, the Army performed maintenance and storage of helicopters at Hangar 90. Typical activities included washing, disassembly, repair, and painting of aircraft. Hangar 90 was cleared and taken out of service when it was decommissioned in early 1996 (USACE, 2002). It is anticipated that the land use at the HHA will continue into the foreseeable future in support of the operations of the Tipton Airport.

### **3.2.6 Little Patuxent River**

The Little Patuxent River is located near the western border of the TAP and flows from the northwest to the southeast. State-listed endangered species are present in this area. A nature trail parallels certain sections of the river. The LPR was not specifically identified in the two RODs for the Tipton BRAC parcel as requiring remedial action.

According to the *Explosives Safety Submission for Ordnance and Explosives Removal and Property Release Tipton Airfield, Fort Meade, Maryland* (USACE, 1995), no UXO clearance was to be conducted in the river therefore the river and adjacent property was to be retained by Department of Defense (DoD). A fence was to be constructed along the river to prevent access with signs posted along the fence warning of UXO.

The Explosives Safety Submission was changed as documented in the *Amendment to Explosives Safety Submission for Tipton Army Airfield, Fort Meade, Maryland* (FGGM, 1997). The Amendment states that the presence of potential state-listed threatened species precludes dredging of the river; however, the presence of ordnance in the river is a safety hazard. Therefore; the banks along the river were cleared of UXO to a depth of 4 feet or the water table (whichever is less) and the surface of the river bed was to be cleared annually. The disposition of LPR in that area was changed from being retained by the Army to disposal.

It is anticipated that the subject stretch of the LPR, from 400 feet south of the Highway 198 Bridge, to the Old Forge Bridge, will remain in its current use for the foreseeable future. The PRR oversees the use of the LPR in this area, and the policy is to prohibit any recreational activities, including swimming, wading, boating, or fishing. A fence has been erected along a portion LPR to discourage access, and signs warning about potential MEC exposure are also posted.

### **3.3 History of Contamination**

The entire TAP is suspect for potential MEC contamination as a result of the historical use of this area as artillery ranges and for troop training. This area has a history of use as a military range as

far back as the early 1920s. In Special Military Maps from 1923, the area which was later designated as Tipton Airfield, was identified as an artillery impact area. A 1941 South Cantonment Map shows that two ranges were located within the future Tipton area. One was an anti-tank range and the other was an anti-aircraft range. In the summer of 1942, 60mm and 81mm mortars were used in this area for target practice. During the same timeframe, live high-explosive shells were fired over the heads of troops for training purposes.

Table 3-1 details the history of chemical and MEC contamination for the TAP.

**Table 3-1: History of Contamination for the TAP**

Evaluation Areas	History of Contamination	
	Chemical	MEC
IAL1 (FGGM 10)	IAL1 was an unlined sanitary landfill from approximately 1950 to 1964; however, the types of material disposed of at IAL1 is unknown. Site investigations include the 1992 Site Inspection (SI) Study (USAEC, 1992) and the August 1998 RI/FS (Kaiser, 1998a).	Historic cantonment maps indicate that the TAP is a potential artillery impact area because of the location of two former military ranges intersecting the property. A 1995- 1997 MEC sweep and removal action was conducted over the entire TAP to remove all ordnance and related scrap to a depth of 4 feet (USACE, 1995 and FGGM, 1997). No intrusive work was conducted at the landfills or within a 25-foot buffer for safety reasons. Paved areas, buildings, and areas beneath water were not included in the sweep.
IAL2 (FGGM 31)	IAL2 was initially operated as a soil borrows area (1938 to 1942) and then used as an unlined rubble disposal area until 1986. Site investigations include the 1992 SI Study (USAEC, 1992) and 1994 SI Study Addendum (addressing data gaps in the previous SI Study) (USAEC, 1994), and the August 1998 RI/FS (Kaiser, 1998a).	See IAL1 MEC description above. IAL2 could not be cleared of suspected MEC because it contains large amounts of rubble debris and is partially composed of wetlands with a shallow water table. The IAL2 was not included in the TAP BRAC land transfer to Anne Arundel County.
IAL3 (FGGM 31)	IAL3 was initially used as a sand borrows area. It was used as a sanitary and “leaf- dump” landfill in the late 1940s and 1950s. The airfield was constructed over IAL3 in 1963. Much of the IAL3 was excavated and disposed off-post. Materials were removed from beneath all the runway construction areas however landfilled materials are still present in areas next to the runways. Site investigations include the 1992 SI Study (USAEC, 1992) and the August 1998 RI/FS (Kaiser, 1998a).	See IAL1 MEC description above. In 1998, a MEC sweep was conducted in and around the IAL3. A long-term monitoring plan was developed for the IAL3 that provided a sweep schedule (years 3, 7, and then every 5 years) to ensure that no MEC items have migrated to the surface through frost action. Subsequent MEC sweeps were conducted in 2001 (USA Environmental, Inc., 2002) and 2006 (USACE, 2007) per the sweep schedule described in the July 1998 Decision Document (FGGM, 1998b).
FTA (FGGM 32)	FTA was constructed around 1979 for training purposes by the Fort Meade Fire Department. Fires were typically set using gasoline or aviation fuel inside the fire training pit or in portable burn pans. Site investigations include the 1992 SI Study (USAEC, 1992), 1994 SI Study Addendum (USAEC, 1994), and the October 1998 RI/FS (Kaiser, 1998b). The October 1998 FTA Removal Action Report documented the removal of the fire pit and the oil-water separators from the site (Radian, 1998).	A 1995-1997 MEC sweep and removal action was conducted over the entire TAP to remove all ordnance and related scrap to a depth of 4 feet (USACE, 1995 and FGGM, 1997). Paved areas, buildings, and areas beneath water were not included in the sweep.
HHA (FGGM 80)	HHA was used for helicopter maintenance, starting in the early 1980s until it was cleared and taken out of service in early 1996. Fuels, hydraulic and lubricating oils, detergents, and solvents were used there. Site investigations include the 1992 SI Study (USAEC, 1992), 1994 SI Study Addendum (USAEC, 1994), and the October 1998 RI/FS (Kaiser, 1998b). The 1999 HHA Removal Action Report documented the removal of the oil/water separators, gasoline evaporation pits, acid pits, and piping related to the hangar area from the site (Radian, 1999).	A 1995-1997 MEC sweep and removal action was conducted over the entire TAP to remove all ordnance and related scrap to a depth of 4 feet (USACE, 1995 and FGGM, 1997). Paved areas, buildings, and areas beneath water were not included in the sweep.
Little Patuxent River (FGGM 85)	None known.	The LPR has the same history of MEC contamination as the other areas of the TAP listed in this Table. However, there have been no subsurface MEC clearances conducted for the LPR. The ESD in 2014 is where the CERCLA requirement was incorporated into the CERCLA process to address potential MEC contamination in the LPR. Prior to the ESD, annual MEC sweeps were conducted (beginning in 2001) of the approximately one-mile stretch of the LPR

### **3.4 Initial Response**

#### **3.4.1 MEC Response**

Multiple ordnance sweeps and removals were performed on portions of the TAP (separate from the Little Patuxent River) starting around 1994 and continuing thru 1999. The most comprehensive sweep and removal was started in 1995, and it had a goal to remove all ordnance and related scrap to a depth of four feet on the TAP (FGGM, 1998b). For this effort, there was no intrusive work conducted at the landfills or within a 25-foot buffer of them, for safety reasons. Paved areas and buildings were also not included in the sweep.

Smaller, more focused follow-up MEC sweeps and removals were conducted over the next several years. These addressed things such as an ordnance removal in an airfield drainage swale in 1998 that covered an area that had standing water during the initial effort.

A non-CERCLA Decision Document (DD) and DD Addendum were finalized in July 1998 (FGGM, 1998b) and November 1998 (FGGM, 1998c). This 1998 DD established the need for a minimum 3-foot-thick earthen UXO safety cover on areas of IAL1, and it also enacted land use restrictions on the lessee. This 1998 DD established: appropriate restrictions on surface/subsurface excavations; the need for erection of a fence around IAL2, and that the Army would retain control of the IAL2 property; and, that regular surface sweeps would be conducted of IAL3. In addition, periodic inspections are required for the IAL2 fence, as well as repair of any damage. The November 1998 DD Addendum established groundwater LUCs, discussed further below.

As part of the establishment of a 3-foot-thick earthen safety cover on IAL1, an ordnance clearance to a 4-foot depth was conducted. The approximately 5.5 acre area of IAL1 that could not be cleared of ordnance was covered with a 3-foot-thick earthen safety cover. In addition, periodic inspections of IAL1 are required to minimize impacts due to erosion.

Upon transfer of the airport property to the Anne Arundel County Tipton Airport Authority in July 2001, the Quitclaim Deed contained provisions for Institutional Controls (ICs) to be in place at TAP. The ICs come in the form of deed restrictions and include a prohibition on accessing or using groundwater underlying the TAP for any purpose, except for the purpose of environmental study or as incidental to construction (the 1998 DD Addendum permitted GW use only for environmental studies). Also prohibited is any surface or subsurface excavations, digging, well drilling or other disturbances of soil, or below paved surfaces, without prior written approval of the Government. The written approval is not required for the emergency repair of existing utilities.

Beginning in 2001, annual MEC sweeps were conducted on an approximately one-mile stretch of the LPR (Figure 5). Up until 2014, these LPR sweeps were conducted separate from the CERCLA

process. However, the ESD finalized in May 2014 established these river sweeps as a CERCLA requirement. The sweeps are conducted on the surface of the river bed and bank, as opposed to subsurface disturbance/dredging due to concerns for state-listed threatened species. Between the years of 2001 to 2014, more than 800 munitions debris items were recovered (the majority of items were practice rockets), however, only five MEC items have been recovered and disposed of during this time.

### **3.4.2 Chemical Contamination Response**

The DD Addendum in November 1998 prohibited the use of groundwater for any purposes other than for conducting environmental studies, and it also restricted residential use without an evaluation of residential exposure risks.

### **3.5 Basis for Taking Action**

Human health risk assessments conducted as part of the two RIs for the TAP resulted in the conclusion of no unacceptable risk based on current and anticipated future uses of the property for five evaluation areas plus the TAP groundwater. The TAA OU consists of FTA, HHA and IAL3; and the TAP OU consists of IAL1, IAL2 and the entire TAP GW. The human health risk assessments evaluated surface soil (site worker and trespasser), subsurface soil (future excavation worker), surface water (trespasser), sediments (trespasser) and groundwater (future site worker).

The ecological risk assessments for the surface soil determined that there were exceedances of toxicity reference values (TRVs) for aluminum, chromium, zinc, vanadium and low level pesticides for terrestrial invertebrates (as represented by earthworms) or for plants. However, based on the combination of there also being TRV exceedances for some of the background metals, as well as the site's current and likely future use remaining as a commercial airfield, it was determined that the site conditions "do not pose an unacceptable risk to... ecological receptors" (FGGM, 1999).

The November 1998 Decision Document Addendum, *Safety Precautions to be taken at Tipton Airfield, Fort George G. Meade, MD* established the LUCs for the groundwater at Tipton. It stated, "In order to further protect the public's health and welfare, the restriction on drilling without prior written approval from the Army is being modified to prohibit the use of groundwater at Tipton for any potable or non-potable purposes except for use in conducting environmental studies; and a restriction to prohibit residential use without evaluation of residential exposure risks is added." Through the 2014 ESD, the LUCs from the 1998 DDs were incorporated into the CERCLA remedy selection documents.

There were several removal actions taken related to MEC on the TAP which focused on removing

MEC to 4 feet below the ground surface (FGGM, 1998b). These actions did not generally address MEC which may be present in:

- a. the footprint of the landfills,
- b. within a 25-foot buffer around the landfills,
- c. areas located under paved surfaces and buildings

Given the lack of evidence of MEC clearance in these three areas listed above, it should be assumed that the potential for encountering MEC exists. Soil disturbance activities in these three areas should be conducted following “moderate to high” probability protocols for encountering MEC. Compliance with appropriate protocols is based on the requirement to obtain Army approval prior to conducting any soil disturbance activities on the TAP.

## 4.0 REMEDIAL ACTIONS

### 4.1 Remedy Selection

The following is a review of the remedies selected at the TAP. Table 4-2 briefly summarizes the selected remedies for each of the TAP OUs and the affected media. Table 4-3 summarizes the LUCs that have been implemented and maintained at the TAP.

The 1998 Decision Document and its Addendum established LUCs (Table 4-3) which perform the following: prohibit any surface or subsurface disturbance of the soil at the TAP without Army approval; requires the Army to retain the IAL2 property and maintain site security (fencing); prohibit drilling of any wells or any other drilling without Army approval; prohibit the use of any groundwater at the TAP for any purpose except environmental studies; and prohibit residential use of the property without a prior residential risk-evaluation. Additionally, the 1998 DD required periodic surface sweeps for MEC for IAL3, the installation of a 3-foot-thick earthen UXO safety cover on IAL1, and periodic monitoring of IAL1 for erosion concerns. These LUCs were in place when the December 1998 and June 1999 RODs were generated, and these land use restrictions allowed for NFA determination with regards to soils and groundwater at the TAP OU and TAA OU. These LUCs were then formally incorporated into the CERCLA RODs via the May 2014 ESD. The 2014 ESD also states that the Army will continue to conduct annual MEC sweeps of the Little Patuxent River.

This Five-Year Review evaluates the remedies established for the three OUs at the TAP. These three OUs and their respective remedies are:

- 1) **Tipton Airfield Area OU (TAA) USEPA OU-17 – FTA, HHA and IAL3 – Established via December 1998 ROD and modified by May 2014 ESD.** NFA with regards to the soils at TAA OU represents a final remedial action determination. Periodic MEC surface sweeps required for IAL3, currently every five years, as well as annual inspections of the condition of IAL3. Land Use Controls (LUCs) restrict excavation or other disturbance of surface or subsurface soils, and prohibit use of GW for any uses other than environmental studies.
- 2) **Tipton Airfield Parcel OU (TAP) USEPA OU-08 – IAL1, IAL2 and entire TAP groundwater– Established via June 1999 ROD and modified by May 2014 ESD.** NFA with regards to the soils, sediment and surface water at TAP OU represents a final remedial action determination. Periodic inspections of IAL1 (3-foot-thick earthen UXO safety cover) and IAL2 are required; for IAL2 this includes the requirement to inspect and maintain security measures (fencing) restricting unauthorized access. LUCs are in place



and they restrict excavation or other disturbance of surface or subsurface soils, and prohibit use of the GW for any uses other than for environmental studies.

The June 1999 ROD presents the groundwater remedy to be NFA with the following monitoring/reporting activities:

- Every two years after the date of the 1999 ROD, the groundwater at the TAP will be sampled from certain wells. These monitoring results will be provided to the Army, the USEPA, and the MDE
- The TAP will be inspected annually to assure compliance with the land use restrictions
- A review every 5 years will be conducted to evaluate the frequency and need for continued groundwater monitoring and to ensure that the remedy continues to provide adequate protection for human health and the environment.
- The May 2014 ESD (URS, 2014b) incorporates the groundwater protection LUCs from the 1998 DD and its Addendum (see Table 4-3) into the CERCLA remedy and states that under the existing remedy the Army will continue to “monitor the groundwater until contaminant levels are below levels specified in the TAP OU LTGM program.” Additionally, the May 2014 ESD increased the sampling frequency to annual to increase the analytical results database in order to better determine a statistical trend.

These LTGM contaminant levels were established in the LTGM Work Plan for the TAP (EA, 2015C) and these groundwater monitoring criteria are outlined in Table 4-1 below.

**3) Little Patuxent River (LPR) MEC USEPA OU-35 – Established via May 2014 ESD.** Periodic (annual) MEC sweeps of the LPR (along about one-mile of river between the Old Forge Bridge to a point 400ft south of Maryland Highway 198, incorporating approximately 8 acres of the river and embankment), with appropriate disposal of ordnance, if discovered.

**Table 4-1: Groundwater Monitoring Criteria for TAP Area Groundwater**

Compound	TAP GW Monitoring Criteria (µg/L)
<i>Volatile Organic Compounds</i>	
1,1,2,2-Tetrachloroethane	0.076 <sup>†</sup>
Benzene	5
Carbon tetrachloride	5
Cis-1,2-Dichloroethene	70
Vinyl chloride	2
<i>Polycyclic Aromatic Hydrocarbon Compounds</i>	
Naphthalene	0.14 <sup>†</sup>
<i>Metals</i>	
Arsenic	10
Iron	14,000 <sup>†</sup>
Manganese	430 <sup>†</sup>

**Notes:**

<sup>†</sup> = No MCL exists; value is the unadjusted tap water USEPA Region 3 Screening Level (RSL) from the USEPA RSL Table, May 2014

It is noted that the ESD makes reference to the existence of a minimum 3-foot-thick earthen UXO safety cover for IAL3 and describes the average landfill cover thickness to be 37-inches. However, a soil cover for IAL3 was never formally selected as a component of the original remedies; neither the 1998 DD nor the 1998 ROD require that a minimum soil cover be maintained.

Additionally, the Army prepared a TAP LUC Remedial Design (LUCRD) which identifies and sets forth procedures to implement the LUCs described in the 1998 DD and DD Addendum as incorporated into the CERCLA remedy via the May 2014 ESD (URS, 2014b). The LUCRD provides a process apart from the Five-Year Review through the requirement to perform annual reviews of LUC implementation and enforcement to ensure implemented LUCs continue to adequately protect human health and the environment.

**Table 4-2 Summary of Affected Media and Selected Remedies for the TAP and LPR**

Evaluation Areas; Operable Unit [Army Evaluation Area]	Affected Media and Selected Remedy				
	Soils	Surface Water	Sediment	Surface and Subsurface MEC	Groundwater (TAP GW OU)
IAL1; TAP OU [FGGM 10]	NFA <sup>(1)</sup>	NFA <sup>(1)</sup>	NFA <sup>(1)</sup>	Between August 1998 and October 1999, a MEC clearance to a 4-foot depth and a 3-foot thick earthen MEC safety cover was constructed. IAL1 is monitored to ensure that the cover is not compromised by erosion. Also, LUCs were implemented. <sup>(3)</sup>	LTGM & LUCs <sup>(1,4)</sup>
IAL2; TAP OU [FGGM 31]	NFA <sup>(1)</sup>	NFA <sup>(1)</sup>	NFA <sup>(1)</sup>	A 3,500 feet long, seven-foot-high chain link fence with three-strand barbed wire was installed; it encloses approximately 20 acres, including the 10-acre landfill. The fence ties into an existing fence along Wildlife Loop Road. The fence is to be inspected periodically and any damage repaired. Also, LUCs were implemented. <sup>(3)</sup>	LTGM & LUCs <sup>(1,4)</sup>
IAL3; TAA OU [FGGM 31]	NFA <sup>(2)</sup>	n/a	n/a	Periodic MEC sweeps are to be conducted every 5 years at IAL3; the next MEC sweep is scheduled for fiscal year 2016. LUCs were implemented. <sup>(3)</sup>	LTGM & LUCs <sup>(1,4)</sup>
FTA; TAA OU [FGGM 32]	NFA <sup>(2)</sup>	n/a	n/a	During ordnance removal activities, all paved areas were excluded <sup>(2)</sup> ; thus there is the potential for the existence of MEC below paved areas at the FTA. Also, LUCs were implemented. <sup>(3)</sup>	LTGM & LUCs <sup>(1,4)</sup>
HHA; TAA OU [FGGM 80]	NFA <sup>(2)</sup>	n/a	n/a	During ordnance removal activities, all paved areas were excluded <sup>(2)</sup> ; thus there is the potential for the existence of MEC below paved areas at the HHA. Also, LUCs were implemented. <sup>(3)</sup>	LTGM & LUCs <sup>(1,4)</sup>
LPR OU	n/a	n/a	Annual Sweeps <sup>(5, 6, 7)</sup>	MEC sweeps are to be conducted periodically (currently annually) in the LPR from 400-ft south of the Maryland Route 198 Bridge, downstream to the Old Forge Bridge (near IAL2). <sup>(5,6,7,9)</sup>	n/a

**Notes:**

IAL = inactive landfill; FGGM = Fort George G. Meade; FTA = fire training area; HHA = helicopter hangar area; MEC = munitions and explosives of concern; NFA = no further action; n/a = not applicable; OU = Operable Unit; LTM = long-term groundwater monitoring; LPR = Little Patuxent River; LUCs = land use controls

**Sources:**

- (1) (FGGM, July 1999) *Final Record of Decision, Tipton Airfield Parcel (TAP) Operable Unit, Fort George G. Meade, Fort Meade, Maryland*, July 1999. USEPA/ROD/R03-99/006.
- (2) (FGGM, December 1998a) *Final Record of Decision, Tipton Airfield Area Operable Unit, Fort George G. Meade, Fort Meade, Maryland*, USEPA/ROD/R03-99/005.
- (3) (FGGM, July 9, 1998b) *Safety Precautions to be Taken at Tipton Airfield, Fort George G. Meade, Maryland, Decision Document*
- (4) (FGGM, November 6, 1998c) *Safety Precautions to be Taken at Tipton Airfield, Fort George G. Meade, Maryland, Decision Document Addendum*
- (5) (EA Engineering, Science, and Technology, Inc. (EA), August 2014) *Work Plan Addendum for Little Patuxent River, Long Term Monitoring, Munitions and Explosives of Concern Survey*.
- (6) (USA Environmental, Inc. August 31, 2007b) *Ordnance and Explosives (OE) Removal Action at the Little Patuxent River, Fort George G. Meade, Maryland, Work Plan Addendum 1, Revision 6*
- (7) (USA Environmental, Inc. February 16, 2001) *Final Work Plan Non-Time Critical Ordnance and Explosives (OE) Removal Action at the Little Patuxent River, Fort George G. Meade, Maryland*
- (8) (URS, 2014b) *Explanation of Significant Difference Report, Tipton Airfield Parcel, Anne Arundel County, MD. Final*.

**Table 4-3 Summary of the LUCs Implemented at the TAP**

LUCs Description	LUC Source
GROUNDWATER	
Prohibit drilling of wells at the TAP.	Decision Document Addendum, Safety Precautions to be taken at Tipton Airfield, Fort George G. Meade, Maryland. Dated 6 November 1998 (FGGM, 1998c).
The restriction on drilling without prior written approval from the Army is modified to prohibit the use of groundwater at the TAP for any potable or nonpotable purposes except for environmental studies.	
Prohibit residential use of the property without evaluation of residential exposure risks.	
MEC	
Prohibit any surface or subsurface excavations, digging, or other disturbances of soil, or below paved surface, without written approval of the Army.	Decision Document, Safety Precautions to be taken at Tipton Airfield, Fort George G. Meade, Maryland. Dated 9 July 1998 (FGGM, 1998b).
The Army’s approval required for activities in the first four feet where there was previous clearance of ordnance items. The exception to this is for emergency repair of existing utilities.	
The Army will retain the IAL2 property and maintain site security. The fence will be inspected periodically and any damage will be repaired.	

**Notes:** The above LUCs established in the described Decision Documents were formally incorporated into the CERCLA RODs via the May 2014 ESD.

## 4.2 Remedy Implementation

The Fort Meade Environmental Partnership, which includes the Army, USEPA Region III, and MDE selected 15 wells for annual groundwater monitoring at the TAP. Groundwater sampling frequency was changed from biennial to annual as per a recommendation in the 2011 Five-Year Review and more formally in the 2014 ESD. No groundwater sampling occurred in 2010 and 2011 during the development of the new LTGM work plan.

The 2012 LTGM work plan and its 2014 Addendum includes sampling one well in the Patuxent Formation, eight wells in porous zones in the Arundel Clay, two wells that are either in permeable zones of the Arundel Clay or in the Lower Patapsco Formation (water table aquifer), and four wells in the Lower Patapsco Formation. Monitoring well identification numbers and the sites that they are associated with are listed in Table 4-4 and presented in Figure 4 and Figures 6-8.

The following groundwater contaminants are sampled in the LTGM program: VOCs (benzene, 1,1,2,2-TCA, carbon tetrachloride, cis-1,2-Dichloroethene, and vinyl chloride), metals (arsenic, iron, and manganese), and PAH (naphthalene). The LTGM results are compared to the groundwater criteria established in the LTGM program, as specified by the ESD. A review like this one will occur every five years to evaluate the frequency and need for continued LTGM. This is to ensure that the remedy continues to provide adequate protection of human health and the environment.

**Table 4-4 Monitoring Well Identification**

Well Identification Number	Well Location
<i>Patuxent Formation</i>	
MW2-2	IAL2
<i>Arundel Clay</i>	
MW1-4	IAL1
MW1-7	IAL1
MW-23	IAL1
MW2-1	IAL2
MW2-4	IAL2
MW-29	IAL2
HHAMW-9	HHA
HHAMW-11	HHA
<i>Lower Patapsco/Arundel Clay</i>	
FTAMW-3	FTA
FTAMW-7	FTA
<i>Lower Patapsco Formation</i>	
MW3-1	IAL3
MW3-2	IAL3
MW3-5	IAL3
MW3-6	IAL3

The Army conducts periodic landfill inspections to ensure that the 3-foot-thick earthen MEC cover at IAL1 has not been compromised by erosion. Additionally, the Army conducts visual inspections of IAL3 as well as the perimeter fence at IAL2 to ensure remains intact and in good condition.

#### **4.3 System Operations/O&M**

The 2014 ESD specifically documents (1) the need for sweeps of ordnance; (2) appropriate disposal of ordnance if discovered; and (3) land use control requirements. All of these components were implemented with the original remedy pursuant to the July 9, 1998 Decision Document, as modified in December 1998. That DD lists the requirement for sweeps of IAL3 (starting in 1998) to occur at three years, seven years and then every five years thereafter. Additionally, the 2014 ESD states that the Army will continue to conduct annual MEC sweeps of the Little Patuxent River.

Current O&M activities include:

- annual physical inspections of the inactive landfills, to include inspection of the 3-foot-thick earthen MEC cover at IAL1, to ensure that the cover has not been compromised by erosion and to verify that the perimeter fence at IAL2 remains intact and in good condition.
- annual sampling of the groundwater LTM wells at the TAP (Table 4-4)

- surface sweeps for MEC at Inactive Landfill 3 every five years with a periodic review of the need for continued sweeps; the next sweep at Inactive Landfill 3 is scheduled for 2016.
- annual instrument assisted visual inspections for MEC along the LPR MEC OU to include the approximately one-mile of river and embankments. (see Table 4-5 for LPR MEC sweep results from last five years)

Additionally, in response to a recommendation of the 2<sup>nd</sup> Five-Year Review, in 2011 the Baltimore District Explosive Safety Staff conducted an instrument assisted visual inspection of the ball fields (in close proximity to the TAP; completed in conjunction with the IAL3 sweep). The area was subjected to a 100% inspection and no evidence was observed that would indicate that MEC was migrating to the surface. Results of the inspection indicated that any potential MEC item remains a minimum of 3 feet below ground surface and presents no hazard (Greene, 2011).

The LTGM monitoring wells are inspected for general condition and structural integrity prior to each LTGM sampling round. This includes the inspection of the following:

- Outer protective casing or flush-mount cover to assess structural integrity.
- Well caps and locks to ensure that both are in place and functioning properly.
- Concrete pad for the presence of cracks and settlement.
- The inner cap and riser pipe to ensure that these items are intact and functioning properly.

Since the previous Five-Year Review, five reports have been submitted regarding the LPR MEC sweeps (USA Environmental, Inc., 2011, and 2013; USACE, 2014; EA, Inc., 2014a and 2016a). Table 4-5 summarizes the findings of these MEC sweeps. The most recent sweeps were conducted August 25-28, 2015 recovered sixty-nine inert 2.36-inch rockets. One live 2.35-inch High Explosive Anti-Tank (HEAT) round was reported during the 2012 sweep. No MEC items were recovered during the 2011, 2013, 2014 and 2015 annual sweeps.

**Table 4-5 LTM Results for MEC at Little Patuxent River Since Last Five-Year Review**

<b>Year</b>	<b>LTM Report</b>	<b>Removal Actions</b>	<b>MEC or MPPEH Present?</b>
20 September 2011	<i>Fort George G. Meade Legacy Base Realignment and Closure Program, Long-Term Monitoring Report, 2011 Little Patuxent River Sweep. Final, May</i> (USA Environmental, Inc., 2011).	(48) 2.35-inch practice rockets and 5 expended rocket motors. No MEC items were recovered during the search.	No
11 September 2012	<i>Fort George G. Meade Legacy Base Realignment and Closure Program, Long-Term Monitoring Report, 2012 Little Patuxent River Sweep. Final, January</i> (USA Environmental, Inc., 2013).	(9) 2.35-inch inert practice rockets and (1) 2.35-inch live High Explosive Anti-Tank (HEAT) round was recovered during the sweep	Yes
25-26 September, 2013	<i>Fort George G. Meade Legacy Base Realignment and Closure Program, Long-Term Monitoring Report, 2013 Little Patuxent River Sweep. Final, April</i> (USACE, 2014)	(4) 2.35-inch expended practice rockets were recovered during the sweep	No
26-27 August 2014	<i>George G. Meade Legacy Base Realignment and Closure Program, Long-Term Monitoring Report, 2014 Little Patuxent River Sweep. Final, December</i> (EA, Inc., 2014a)	(102) 2.36-inch inert training rockets	No
25-28 August 2015	<i>Final Long-Term Monitoring Report for 2015 Little Patuxent River Munitions and Explosives of Concern Survey Patuxent Research Refuge, Fort George G. Meade, Maryland</i> (EA Inc., 2016a)	(69) 2.36-inch practice rockets. All 69 items certified as Materials Deemed as Safe.	No

The annual monitoring costs for the LTGM program are shown in Table 4-6. The annual costs for the Little Patuxent River MEC Sweeps and landfill inspections for the current Five-Year Review cycle are presented in Table 4-7.



**Table 4-6 Long-Term Groundwater Monitoring Costs for the TAP**

<b>LTGM Dates</b>	<b>Total Cost Rounded to Nearest \$1,000</b>
2011	\$0
June 2012	\$49,000
July 2013	\$49,000
October/November 2014	\$16,000
2015	\$14,000

**Notes:** LTGM not conducted in 2011 for TAP. The costs shown for the LTGM program do not include Army supervision and administrative costs. Starting in 2014, there was a new LTGM contract, with subsequent lower costs.

**Table 4-7: LTM Costs for Annual LPR MEC Sweeps and Landfill Inspections**

<b>LTM Year</b>	<b>Total Cost Rounded to Nearest \$1,000</b>	
	<b>Little Patuxent River MEC Sweeps (a)</b>	<b>IAL 1, 2 and 3</b>
2011	\$55,000	\$8,000
2012	\$60,000	\$11,000
2013	\$40,000	\$260,000 (b)
2014	\$34,000	\$3,000
2015	\$31,000	\$3,000

**Notes:**

- (a) The costs shown for the LTM program do not include Army supervision and administrative costs.
- (b) This cost includes cover drainage swale maintenance for IAL3 which was incurred in 2013 and activities completed in 2014

## **5.0 PROGRESS SINCE LAST REVIEW**

### **5.1 Protectiveness Statement from Last Review**

The protectiveness statement from the previous Five-Year Review year is as follows:

The remedy at the TAP currently protects human health and the environment because the LUCs protect the public from exposure to contaminated groundwater and MEC; the LTGM program documents that the detected groundwater contaminants are naturally attenuating and are not migrating off property. However, in order for the remedy to be protective in the long term the following actions need to be taken to ensure long-term protectiveness: submit an ESD to change the remedy from “NFA with groundwater monitoring” to “LUCs with groundwater monitoring” and submit a LUCIP to better enforce and maintain the LUCs at the TAP.

Note that the previous Five-Year Review refers to a LUCIP (Land Use Control Implementation Plan), which in this report is referred to as a LUCRD.

### **5.2 Status of Recommendations and Follow-Up Actions from Last Review**

The following table outlines issues and recommendations stated in the past review (including the two stated in the protectiveness statement above), and discusses any subsequent actions.

**Table 5-1: Status of the Second (2011) Five-Year Review Report Recommendations**

Issues from Previous Review	Recommendations/Follow-up Actions	Milestone Date	Action Taken and Outcome
The soil cover at the IAL1 needs maintenance work to remove the young trees and repair ruts in the cover.	Implement a grubbing program in fiscal year 2012 to remove vegetation that might disturb the soil safety cover at the IAL 1; perform inspection in fall/winter when vegetation is less dense to verify that the integrity of the soil cover remains intact.	Fiscal Year 2012	Grubbing program was initiated; most recent maintenance activities were conducted in spring of 2015 and included cutting and removing large trees, and brush mowing down to 1-inch height above landfill surface.
The site inspection noted the following issues regarding the IA2 perimeter fence: 1) roughly 60 percent of the fence is overgrown with heavy vegetation, 20 some portions are submerged in water within a wetlands area and are subject to accelerated corrosion, and 3) some downed trees were reported along the fence line in the western perimeter. Sections of IAL2 fence may require repairs to ensure integrity of fence as a MEC LUC.	The Army has contracted to remove the vegetation along the perimeter of the fence and conduct fence repairs, as needed, in fiscal year 2011	Fiscal Year 2011	A contractor has been obtained and provides annual maintenance for the fence perimeter, including: downed tree removal, fence repair, and vegetation clearing (removal and herbicide applications).
Some settlement ridges were identified at the IAL3.	Re-grade the swales and level the surface of IAL3's cover to remove settlement ridges.	Fiscal Year 2011	In 2014 the Army contracted for repair of the settlement areas by bringing in fill material and grading these areas to the original grade of the landfill surface.
Some fence segments located between the ball fields and the Little Patuxent River have fallen down.	Complete the MEC sweep of the ball fields (which is not part of the TAP) and repair the fallen fence segments in fiscal year 2012	Fiscal Year 2012	A 100% sweep of the ballfield area occurred in May 2011 and concluded that any potential MEC items remain at a minimum 3 feet below ground surface and present no hazard. The LPR fence near the ballfields, north of the Tipton airfield at last check was repaired after a flood circa March 2014. (PRR-NT staff, November, 2015).
USEPA requested more data documenting the natural attenuation of the groundwater contaminants at the TAP.	Revise the LTGM work plan. Derive FGGM –specific groundwater background levels. Change the LTGM sampling from biennial to annual. Add VOC breakdown daughter products to the LTGM Repair/maintain the well casings and pads at the TAP.	Fiscal Year 2011	Work plan addendum for combined BRAC groundwater operable units (of which TAP is one) was submitted October 2014. On 26 May, 2015 a final amendment to the work plan for the combined operable units was submitted. FGGM-specific groundwater background levels have <i>not</i> been established. Groundwater sampling was changed from biennial to annual. VOC daughter breakdown products (vinyl chloride, and cis-1,2-Dichloroethene) were added. Well casings and pads were inspected in 2015 and evidence of maintenance/ repair activities was reported.

USEPA requested that the groundwater and MEC LUCs identified in 1998 Army Decision Documents be incorporated into the CERCLA RODs.	Submit an ESD to better incorporate the groundwater and MEC LUCs into the CERCLA process. Also, submit a LUCIP to ensure the continued protectiveness of the LUCs implemented at the TAP.	Fiscal Year 2012	An ESD was issued by the Army and approved by the USEPA in May 2014. The ESD incorporates the remedies established in the 1998 DD and its Amendment to the CERCLA RODs to clearly document: (1) the need for sweeps of ordnance; (2) appropriate disposal of ordnance if discovered; and (3) land use control requirements. The Army is currently preparing a LUC Remedial Design (Draft Final) which identifies and implements the LUCs mandated in the 1998 and 1999 RODs as amended by the May 2014 ESD.
<p>Several incidents have been reported where the public has come into contact with potential MEC items:</p> <ol style="list-style-type: none"> <li>1) Evidence of fishing at the Little Patuxent River is seen in the vicinity where MEC and MPPEH occur.</li> <li>2) A citizen attempted to collect a potential MEC item from the Little Patuxent River.</li> </ol> <p>A Tipton Airport contractor engaged in unauthorized excavation and encountered a buried rocket.</p>	<p>Conduct a MEC clearance between river bends A and B of the Little Patuxent River to the depth of detection using a Schonstedt magnetometer or similar instrument.</p> <p>Place more signs in the area of concern along the river bend warning fishermen and citizens that their presence is unauthorized and that MEC is present and should not be handled.</p> <p>Reinforce educational outreach programs that warn the public of the potential MEC and MPPEH hazards at the TAP, Little Patuxent River, and ball fields.</p>	USEPA and MDE approved decision (June 2010)	<p>Instrument assisted MEC sweeps are conducted annually along this stretch of the Little Patuxent River.</p> <p>There are signs along the LPR river bend, near the ball fields, warning that entry is unauthorized and that MEC is present and should not be handled. Since the last 5YR, additional signs have been placed along the area of the LPR river bend and along the fence of the ball fields.</p> <p>There are signs at PRR-NT, especially at entrances and along the LPR and Patuxent Rivers, warning that MEC is present at PRR-NT, that it should not be handled, and a phone number to call if suspected MEC/MPPEH is found. However, there has not been an increase in the educational outreach program.</p>

### **5.2.1 Results of Implemented Follow-up Actions**

In general, the implemented follow-up actions to the recommendations from the last Five-Year Review achieved their intended results.

The ESD issued in May of 2014 formalized the requirement to conduct MEC sweeps for IAL3 and a portion of the LPR, as well as for appropriate disposal of ordnance, if discovered. The MEC sweeps have been on-going at the TAP since 1998 at IAL3 (FGGM, 1998a), and since 2001 on an approximately one-mile stretch of the LPR on the west/southwest side of the TAP (USA Environmental Inc., 2002). As this is the first mention of MEC sweeps of the LPR by any of the RODs/DD, and the sweeps are a discrete action that comprises an incremental step toward comprehensively addressing site problems, then the LPR sweeps function as a separate OU for the Site.

### **5.2.2 Status of Incomplete Recommendations and Follow-up Actions**

The following recommendations from the previous Five-Year Review had incomplete follow-up actions:

- Establish FGGM groundwater background levels
- Reinforce educational outreach programs that warn the public of the potential MEC and MPPEH hazards at the TAP, Little Patuxent River, and ball fields.

Increases in the educational outreach at the TAP is a topic that should be addressed by the Army and property owners.

## 6.0 FIVE YEAR REVIEW PROCESS

### 6.1 Administrative Components

This third Five-Year Review for TAP was performed by USACE; stakeholders in this review process include representatives of the DoD, FGGM, USEPA, MDE, PRR, DOI, and the surrounding community. Table 6-1 lists the USACE review team members. Table 6-2 presents key stakeholder point of contact information.

**Table 6-1: Review Team Members**

Name/E-Mail	Title	Organization	Phone
Dennis Powers <a href="mailto:Dennis.j.powers@usace.army.mil">Dennis.j.powers@usace.army.mil</a>	Baltimore District USACE Supervisory Chemical Engineer	USACE	410-962-4454
Andrew Layman <a href="mailto:andrew.j.layman@usace.army.mil">andrew.j.layman@usace.army.mil</a>	Baltimore District USACE Environmental Engineer	USACE	410-962-3281
Grant Anderson <a href="mailto:grant.a.anderson@usace.army.mil">grant.a.anderson@usace.army.mil</a>	Baltimore District USACE Hydrologist	USACE	410-962-3656
Dr. Richard Braun <a href="mailto:richard.j.braun@usace.army.mil">richard.j.braun@usace.army.mil</a>	Baltimore District USACE Risk Assessor	USACE	410-962-2842
Mona Ponnappalli <a href="mailto:Mona.d.ponnappalli@usace.army.mil">Mona.d.ponnappalli@usace.army.mil</a>	Baltimore District USACE Chemical Engineer	USACE	410-962-3548

A public notice of this Five-Year Review is in review for publication and the 30-day public comment period will begin immediately after the publication of the notice.

The Army as the lead agency oversees Tipton Airfield Parcel's environmental restoration program. USEPA is the lead regulatory agency in consultation with MDE have been notified of the Army's intent to perform the Five-Year Review for the TAP. Copies of the document will be provided to USEPA and MDE for their review and comment.

USACE-Baltimore established the review schedule whose components included:

- Community Involvement
- Document Review
- Data Review

- Site Inspection
- Local Interviews
- Five-Year Review Development and review

The schedule extends through September 2016.

**Table 6-2: Stakeholder Points of Contact**

Name/E-Mail	Title	Organization	Phone
Andrea Graham <a href="mailto:andrea.a.graham@usace.army.mil">andrea.a.graham@usace.army.mil</a>	Baltimore District USACE Project Manager	USACE	443-986-3444
Markus Craig <a href="mailto:markus.a.craig.civ@mail.mil">markus.a.craig.civ@mail.mil</a>	Program Manager	HQDA BRACD	703-545-2474
Steve Cardon <a href="mailto:Steven.C.Cardon.ctr@mail.mil">Steven.C.Cardon.ctr@mail.mil</a>	Ft. Meade BRAC Environmental Coordinator	Department of the Army	301-677-9178
Michael Wassel <a href="mailto:michael@tiptonairport.org">michael@tiptonairport.org</a>	Tipton Airport Manager	Tipton Airfield	410-222-6815
Robert Stroud <a href="mailto:Stroud.Robert@epa.gov">Stroud.Robert@epa.gov</a>	Federal Remedial Project Manager	USEPA	410-305-2748
Dr. Elisabeth Green	Remedial Project Manager	MDE	410-537-3346

## 6.2 Community Notification and Involvement

Fort Meade has an active Restoration Advisory Board (RAB) that meets periodically to discuss ongoing environmental restoration activities. Notice of this Five-Year Review has been provided to the RAB as the document is at the draft stage. A public notice of this Five-Year Review has been published in the appropriate local newspapers (Appendix A) which initiated the 30-day public comment period. These papers included the Crofton West County Gazette, the Bowie Blade and the Maryland Gazette.

## 6.3 Document Review

The documents which were reviewed to complete this third Five-Year Review can be found in Appendix B. This Five-Year Review consisted of a review of relevant documents including O&M records and monitoring data. While none of the existing Decision Documents or RODs specifically established quantitative Remediation Goals (RGs), clean up goals, Applicable or

Relevant and Appropriate Requirements, or RAOs, the May 2014 ESD (URS, 2014b) incorporates the 1998 Army DD and its Addendum into the CERCLA RODs and states that under the existing remedy the Army will continue to “monitor the groundwater until contaminant levels are below levels specified in the TAP OU LTGM program.”

## **6.4 Data Review and Trends**

The objective of the groundwater data review is to analyze the data from the selected remedy and ensure that this remedy is meeting the objectives established in the RODs and the 2014 ESD, and to determine whether the response actions remain protective of human health and the environment. Tables 6-3 and 6-4 present the historical screening results for analytes exceeding MCLs or RSLs when no MCLs are available. Groundwater screening results can be found in Tables A-D, immediately following the text of this report. LTGM sampling events did not occur in 2010 and 2011.

### **6.4.1 MCL Exceedances**

In the 2012 through 2015 LTGM sampling events, no organics were detected above MCLs. In previous LTGM events, benzene was detected slightly above MCLs (Table 6-3), but the detected concentrations of benzene have since dropped below the MCL.

During the 2012 through 2015 sampling events, arsenic was detected just above the MCL at IAL2, always at well MW-29 (Table 6-4). Tables A through D (located post-text) show the LTGM Results for 2015 (draft report), 2014, 2013 and 2012, respectively. Figures 6 through 8 show the MCL exceedances at TAP for 2014, 2013 and 2012, respectively. The 2015 sampling did not result in any MCL exceedances at TAP.

### **6.4.2 RSL Exceedances**

In the 2012 through 2015 LTGM sampling event, naphthalene was detected above its RSL (0.14 µg/L), in 2012, 2013 and 2014. It was not detected above RSL in any of the 2015 samples.

While 1,1,2,2-TCA was non-detect at the laboratory Limit of Detection (LOD) in 2012 through 2015, and the associated LOD ranged from 0.2 µg/L to 0.4 µg/L. The RSL (0.076 µg/L) for 1,1,2,2-TCA is probably analytically unattainable and no MCL exists.

Table 6-4 presents the RSLs exceedances for the inorganics iron, and manganese. Arsenic is compared only to its MCL. Iron and manganese always exceeded the RSLs at IAL1, IAL2, HHA, and FTA, during the 2012-2014 sampling events, except for iron at FTA in 2014. The draft 2015 LTGM reported exceedances for iron and manganese at IAL2 and HHA and an exceedance for manganese at IAL1. Inorganics were not evaluated at IAL3 for any of the above



years.

**Table 6-3: History of Organic Analyte Exceedances at the TAP**

Groundwater COC <sup>(a)</sup>	Results (µg/L)										Screening Criteria (µg/l)	
	RI/FS 1998	LTGM 2001	LTGM 2003	LTGM 2005	LTGM 2007	LTGM 2009	LTGM 2012	LTGM 2013	LTGM 2014	LTGM 2015 (draft)	MCL	RSL <sup>(c)</sup>
<b>Inactive Landfill No. 3</b>												
TCL VOCs												
Benzene	8.7	9.4	5.4	0.58 J	3.2	2.6	1.5	1.9	1.7	1.5 J	5	0.41
1,1,2,2-Tetrachloroethane	3.5	2.5	1.9	ND	1.1	0.82	0.2 U	0.2 U	0.2 U	0.4 U	-	0.076 c
<b>Fire Training Area</b>												
TCL VOCs												
Benzene	16	2.2-12.8	0.91	0.5J	0.67J	ND	0.08 J	0.12	0.5 U	1.0 U	5	0.41 c
Carbon tetrachloride	0.95	2.4-3.2	0.66	ND	0.37 J	ND	0.2 U	0.2 U	0.5 U	0.5 U	5	0.44c
TCL PAHs												
Naphthalene	24 J	10	ND	0.61	TR 0.35 J	0.66 J, s	0.31	0.18	0.489	0.0943 U	-	0.14 c

**Notes:**

MCL exceedance shaded in yellow

RSL exceedance shaded in green (in absence of MCLs)

ND: Non-detect against an unspecified

c: Cancer

LTGM: Long-term groundwater monitoring

MCL: Maximum Contaminant Level

PAH: Polycyclic aromatic hydrocarbon

NS: Not sampled

-: No Data Available

U: Non-detect at the laboratory LOD

RI/FS: Remedial Investigation/Feasibility Study

RSL: USEPA Region 3 Screening Level (dated November 2010)

SVOC: Semi-volatile organic compound

TCL: Target compound list

VOC: Volatile organic compound

J: Estimated result reported

TR: Trace

s: Surrogate failure

--: Sample not tested for component

\* Removed from LTGM program

(a) Organics were not detected at the Inactive Landfill No. 2 and Helicopter Hangar Area Evaluation Areas.

(b) The concentration, in context of laboratory error, is not much different from a result of 6 µg/L (the MCL) and is very close to the analytical reporting limit of 5 µg/L

(c) The cancer RSL (indicated with “c”) is protective of a target cancer risk of  $1 \times 10^{-6}$

**Table 6-4: History of Inorganic Analyte Exceedances at the TAP**

Groundwater COC	Results (µg/L)										Screening Criteria (µg/l)	
	RI/FS 1998	LTGM 2001	LTGM 2003	LTGM 2005/06 <sup>(a)</sup>	LTGM 2007	LTGM 2009	LTGM 2012	LTGM 2013	LTGM 2014	LTGM 2015 (draft)	MCL	RSL <sup>(b)</sup>
Inactive Landfill No. 1												
Arsenic	10.7	ND	ND	7	8.3	ND	1.6 J	5.3	1.8	1.5 U	10	0.052 c
Iron	72,000	40,300	43,000	42,000	47,000 D	47,700	33,000	42,300	28,200	12,300	-	14,000
Manganese	4,300	2,960	2,890	3,090	2,400 D	2,970	1,910	2,930	1,740	1,910	-	430
Inactive Landfill No. 2												
Arsenic	36.9	ND	13.6	13	NS	ND	11	11	10.8	9.4	10	0.052 c
Iron	50,000	47,700	42,400	54,500	NS	50,600	38,100	46,500	37,400	43,500	-	14,000
Manganese	1,600	1,080	772	1,820	NS	1,520	1,570	1,730	1,330	1,420	-	430
Fire Training Area												
Arsenic	ND	ND	ND	ND	ND	ND	1.6	1.7	1.08 J	1.5 U	10	0.052 c
Iron	22,400	33,600	11,800	15,200	10,000 D	3,710	17,800	18,400	12,600	1,170	-	14,000
Manganese	4,620	2,010	890	1,040	1,700 D	1,510	1,470	1,100	1,990	267	-	430
Helicopter Hanger Area												
Arsenic	16.2+	ND	ND	4 J	19	ND	2.3	1.5	1.32 J	1.86 J	10	0.052 c
Iron	17,000	34,100	31,900	27,000	61,000 D	31,900	52,000	103,000	17,400	64,300	-	14,000
Manganese	957	2,640	1,860	857	1,300	2,160	2,000	2,840	1,540	2,090	-	430

**Notes:**

MCL exceedance shaded in yellow

RSL exceedance shaded in green (in absence of MCLs)

ND: Non-detect

c: Cancer

nc: Non-cancer

LTGM: Long-term groundwater monitoring

MCL: Maximum Contaminant Level

--: Sample not tested for component

RI/FS: Remedial Investigation/Feasibility Study

RSL: USEPA Region 3 Screening Level (dated November 2010)

NS: Not Sampled

D: Diluted result reported

+: Analyte is present. Reported value may be biased high

J: Estimated value

-: No Data Available

U: Non-detect at the laboratory LOD

<sup>(a)</sup> The inorganic data collected in June/July 2005 were suspect because of elevated levels of particulate material due to non-purging of one well volume prior to sampling. The June/July inorganic sample results were discarded and replaced with January 2006 inorganic sample data when LTGM purging procedures were properly followed.

- (b) *The cancer RSL (indicated with “c”) is protective of a target cancer risk of  $1 \times 10^{-6}$ . The non-cancer RSL is protective of a target non-cancer quotient of 0.1*

### 6.4.3 Groundwater Trends and Recommendations

Concentrations of inorganics do not appear to exhibit any trends, except for arsenic at IAL1 (MW-23) which appears to be declining, although it has been well below its MCL of 10 µg/L for each of the last four sampling events. Arsenic has only slightly exceeded its MCL at MW-29 in 2012, 2013 and 2014, and is slightly below its MCL in 2015. There do not appear to be any trends for the other two inorganics, iron and manganese, which are commonly detected above their RSLs. Iron, with an RSL of 14,000 µg/L, is commonly detected at two to four times its RSL, and at as much as about seven times its RSL. Manganese, with an RSL of 430 µg/L, is commonly detected at about two to five times its RSL, and as high as seven times its RSL. It appears that the lack of a definitive trend for the non-arsenic inorganics may be indicative of background fluctuations. It is recommended that a background study be performed which would potentially support this conclusion for iron and manganese. Since arsenic continues to slightly exceed its MCL in several of the recent sampling events for MW-29, it is recommended that sampling be continued unless: 1) it definitively drops below its MCL for several sampling events, or, 2) it is demonstrated to be related to background arsenic levels.

Since 2012 (four annual monitoring events), there have been no MCL exceedances for any of the four VOCs that have an MCL (benzene, carbon tetrachloride, cis-1,2-DCE, and vinyl chloride). There have been seven detections for benzene out of the 32 total samples, with the maximum detected benzene detection of 1.9 µg/L during this period, well below its MCL of 5 µg/L. Carbon tetrachloride has not been detected in any sample during the four events between 2012 and 2015. Its MCL is 5 µg/L. Cis-1,2-DCE has only been detected three times in any of the samples, at a maximum level of 0.17 µg/L, well below its MCL of 70 µg/L. Vinyl chloride has only been detected twice in any of the samples from 2012 to 2015, at a maximum level of 0.1 µg/L, in 2012. 1,1,2,2-TCA has not been detected in any samples in the period of 2012 to 2015. Its RSL is 0.076 µg/L, which is significantly lower than the commonly listed reporting limit of 0.2 to 0.4 µg/L.

In summary, there have been no MCL exceedances for VOCs at the TAP since the last Five-Year Review. Also, for 1,1,2,2-TCA, there have been no exceedances of its RSL, though the reporting limits are about three to five times higher than the RSL. VOCs do not appear to be a concern, and it is recommended that monitoring could be halted for at least the four VOCs that have an MCL (benzene, carbon tetrachloride, cis-1,2-DCE, and vinyl chloride.) In addition, suggest that a more appropriate criteria than the RSL be established for 1,1,2,2-TCA, since this criteria does not appear to be achievable with current laboratory reporting limits.

Naphthalene has been detected in about one-half of the sample results from the last four GW sampling events (detected in six out of eleven results). However, naphthalene has only been detected in one out of the six sample results from the past two annual events. This one result of 0.489 µg/L is about three times the current RSL of 0.14 µg/L. In summary, it appears that naphthalene may be decreasing in frequency of detection, as well as its detected concentrations. However, it is recommended that the same monitoring program be continued for naphthalene to confirm or refute this potential trend.

## **6.5 Site Inspection**

The Tipton Airfield Parcel Site Inspection was conducted on 08 May, 2015 by Mona Ponnappalli (USACE Chemical Engineer), Rich Braun, PhD (USACE Risk Assessor), Steve Cardon (BRAC Environmental Coordinator) and Michael Wassel (Tipton Airport Manager). The purpose of the inspection was to assess the protectiveness of the remedy as a part of the Five-Year Review of the Tipton Airfield Parcel. No sampling was performed during the site visit. The weather at the time of the site visit was warm (~85°F) and mostly sunny. The memorandum for the USACE site visit with photos is included in Appendix B.

The covers on these landfills are functioning as intended. They continue to serve as effective barriers minimizing potential contact with potential underlying MEC or other materials. The natural soil cover at IAL1 consists of overgrown grassy fields. No fill material, major depressions, animal burrows, erosion, cracks, seeps or ponding was observed. No unexploded ordnance was observed. IAL1 does not have benches or venting.

The surface of IAL3 is either asphalt, buildings, or natural soil cover with tall grasses (~15 inches in height). The natural soil cover is rolling and uneven; although much improved since the cap repair. No fill material, major depressions, animal burrows, erosion, cracks, seeps or ponding was observed. No unexploded ordnance was observed. IAL3 does not have benches or venting. The fences enclosing the portions of the HHA are present and restrict access. Warning signs are posted at both sites, identifying them as contaminated.

No new wells were observed that would suggest unauthorized use of groundwater. Similarly, no new commercial or residential construction has been observed near the TAP that would raise the possibility of off-site groundwater use.

IAL2 was not walked over. It was photographed from Wildlife Loop Road on its southern border. The perimeter of IAL2 facing Wildlife Loop Road was guarded by a tall (~7-feet high) chain link fence with barbed wire on top with environmental area warning signs posted. IAL2 is still retained by the Army (Fort Meade).

Generally, all observed monitoring wells are intact and facilitate groundwater monitoring as intended. At two monitoring wells, (MW 1-4 and HHAMW-11) only three safety bollards (instead of four) were observed. A number of the wells were not clearly labeled according to the names given to them in the groundwater reports. These included MW 1-4, MW-23, HHAMW-9, and HHAMW-11. Well head rehabilitation was conducted during the 2015 annual sampling event (after this site inspection), and the labeling has been corrected.

## **6.6 Interviews**

Interviews were conducted with the following Tipton Airfield Parcel related personnel: Steve Cardon (BRAC Environmental Coordinator), Michael Wassel (Tipton Airport Manager), Robert Stroud (EPA Region III) and Elizabeth Green (Maryland Department of the Environment).

Mr. Michael Wassel, the airport manager, was interviewed by Mona Ponnappalli verbally at the end of the Site Inspection on 08 May, 2015. Mr. Wassel was asked a series of questions about the status and effectiveness of the response action at TAP. Mr. Wassel stated that since the repair of the settlement ridges at IAL3, there have not been any problems or concerns with the on-going monitoring and maintenance activities at the TAP. Mr. Wassel also confirms that the prohibition against excavation anywhere at the airport without MEC avoidance support, except in the case of emergency utility repair, is generally effective and conveyed to all personnel, including contractors, working at TAP.

Mr. Steve Cardon, the BRAC Environmental Coordinator for Fort Meade, was interviewed by phone on 26 July, 2015. Mr. Cardon's overall impression is that TAP's remedy continues to be protective of human health and the environment and that the remedy continues to function as expected. There has been one emergency response incident at the TAP when a small private airplane crash landed at IAL1 on 8 February, 2015. Mr. Cardon suggested that the MDE, USEPA and Army should agree on the details of a background level for contaminants, especially metals at the Fort Meade area.

Dr. Elisabeth Green, MDE, was interviewed by phone on 7 October, 2015. Dr. Green's overall impression is that TAP's remedy continues to function as expected. Dr. Green regularly receives groundwater sampling reports from the FGGM-BRAC.

Robert Stroud, USEPA Region III, was contacted for an interview on 14 October, 2015 and on October 23<sup>rd</sup>, returned a (CERCLA Five-Year) questionnaire sent to him. Mr. Stroud's overall impression is the remedy and LTM continue to work as planned.

The interview records are an attachment to the Site Inspection Checklist (Appendix C).

## 7.0 TECHNICAL ASSESSMENT

### **Question A: Is the remedy functioning as intended by the decision documents?**

**Yes.** The TAP remedies (groundwater monitoring, LUCs, and MEC sweeps of the Little Patuxent River) are functioning as intended by the Decision Documents.

As required under the existing remedy, the Army has:

1. Monitored the groundwater contaminant levels as specified in the TAP OU LTGM, October 2014 Work Plan Addendum (MCL, if MCL not available then RSL). Groundwater VOCs include: Benzene, Carbon tetrachloride, cis-1,2-Dichloroethene, Vinyl chloride, Naphthalene, and 1,1,2,2-Tetrachloroethane. Metals include: Arsenic, Iron, and Manganese. Groundwater migrating from the landfills has been monitored for over a decade and shows little VOC contamination. Except for Benzene which is less than the MCL, all other VOCs are non-detect. The metal Arsenic is currently less than the MCL. Manganese is less than the RSL for 2 locations and greater than the RSL at 3 locations (less than 5 times the RSL). Iron is less than the RSL at 3 sampling locations and greater than the RSL at 2 locations (less than 5 times the RSL).
2. Controlled exposure to site-related contaminants and hazards by performing inspections of the inactive landfills, restricting excavation activities, prohibiting residential development, and limiting installation of groundwater wells to those required for environmental studies. As required by the 2014 ESD, the LUCRD has been submitted. No residential development has occurred, no landfill excavations have been conducted, and no exposure to or ingestion of contaminated groundwater has occurred. The 2014 maintenance actions at IAL 1 and IAL 3 that involved soil disturbance were conducted with MEC support.
3. Conducted MEC sweeps of the Little Patuxent River and inactive Landfill 3. Since the last 5-year review annual Little Patuxent River munition debris (and MEC) removals have been conducted (2011, 2012, 2013, and 2014). In 2012 the MEC removal included one live 2.35 inch High Explosive Anti-Tank round.

### **Question B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives used at the time of the remedy selection still valid?**

**Yes.** The Tipton Airport Parcel continues to be operated by Anne Arundel County as a small municipal airport. The airport land use and onsite airport employee potential exposures remain unchanged. There continue to be no on-site human groundwater receptors, or inactive landfill soil (potential MEC) receptors, or Little Patuxent River sediment (potential MEC) receptors. The exposure assumptions remain unchanged and are still valid.

The USEPA Toxicity Values and the Cleanup Levels (MCL or RSL) presented in the TAP OU LTGM, October 2014 Work Plan Addendum for VOCs (Benzene, Carbon tetrachloride, cis-



1,2-Dichloroethene, Vinyl chloride, Naphthalene, and 1,1,2,2-Tetrachloroethane) and metals (Arsenic, Iron, and Manganese) are all unchanged compared to current Toxicity Values and RSLs (November 2015) and MCLs (February 2016). This means the Toxicity Data and Cleanup Levels for groundwater contaminants remain the same.

Since the selection of the remedy for the FTA, there has been an increasing awareness of the hazards presented by the emerging contaminants perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), which fall into a group of chemicals referred to as perfluorinated chemicals (PFCs). PFCs have been used to make fire-fighting foams, among many other uses. Considering the period of activity of the FTA, it is likely that fire-fighting foams used there contained PFCs.

**Question C: Has any other information come to light that could call into question the protectiveness of the remedy?**

**No.** No new information was identified that could call into question the protectiveness of the TAP remedy. No new complete groundwater exposure pathways or capped landfill soil exposure pathways were identified for ecological receptors. No weather-related events have affected the protectiveness of the remedy. Current and anticipated surrounding future land use will likely remain unchanged.

## **7.1 Technical Assessment Summary**

The data review, the site inspection, and the interviews indicate that the remedy is functioning as intended. No changes in the physical conditions of the TAP have occurred that would affect the protectiveness of the remedy. No new information calls into question the protectiveness of the remedy.

## 8.0 ISSUES

At this time there are no issues at the TAP which affect protectiveness. Concerns which do not affect protectiveness are:

1. At IAL1, a minor erosion scour hole (approximately 2 ft by 1 ft by 0.5 ft deep) was observed along the northern edge of the cover and an approximately 10 ft by 10 ft by 0.5 to 1 ft deep potential depression area was identified within the cover boundary. In addition, 0,5 to 1 ft deep tire ruts were observed on the soil cover surface; most likely these were created by emergency vehicles responding to the February 2015 plane crash that occurred adjacent to Tipton Airport (EA, 2016b).
2. At IAL 2, during the most recent landfill inspection, there were only minor concerns observed. These included: partial fading of warning signs along the perimeter fence; partial regrowth of vegetation in the interior and exterior 5 ft buffer areas adjacent to the perimeter fence; and minor animal burrows were noted under the fence (FGGM, 2015a).
3. At IAL 3, a bare soil area approximately 6 ft by 35 ft by 0.5 ft deep was observed on the south edge of the landfill, south of the runway. Weathered glass shards and rounded gravel contributed to the appearance that this area receives significant stormwater runoff from the runway and is exhibiting erosion. Also, a few groundhog holes were observed across the landfill cover area (EA, 2016b).
4. It is uncertain if concentrations of metals in the groundwater can be attributed to background levels; this cannot be resolved until stakeholders agree upon a formalized set of FGGM-specific background levels for these metals.
5. Since the selection of the remedy for the FTA, there has been an increasing awareness of the hazards presented by the emerging contaminants perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), which fall into a group of chemicals referred to as perfluorinated chemicals (PFCs). PFCs have been used to make fire-fighting foams, among many other uses. Considering the period of activity of the FTA, it is likely that fire-fighting foams used there contained PFCs.
6. RSLs as groundwater monitoring criteria can be problematic, as there are some RSLs which are below readily obtainable environmental laboratory method detection limits.

## 9.0 RECOMMENDATIONS

Recommendations for the concerns at the TAP which do not affect protectiveness are:

1. At IAL1, repair the erosion scour hole on the northern edge of the cover and the tire ruts across the cover as soon as practical to limit potential for further erosion damage into the 3 ft thick UXO safety cover. Also, make observations of the 10 ft by 10 ft depression/settlement area to determine if additional settlement has occurred and/or if the cover has been compromised and requires repair.
2. At IAL 2, continue to inspect the fence line of IAL2 after significant storm events. Conduct future inspections during late fall, winter, or early spring when vegetation is low. More frequent routine cutting of the vegetation along the fence line is recommended. Due to the herbaceous nature of the vegetation and the proximity to the Patuxent Research Refuge, physical cutting and removal is suggested in lieu of additional herbicide applications. Ensure signs are compliant and present at all gates and along the entire fence, and replace sun bleached signage along Wildlife Loop Road. Continue to monitor the northern section of the fence spanning the pond/wetland in order to determine frequency of dry periods and evaluate if the fence should be extended to the ground (FGGM, 2015).
3. At IAL 3, the erosion areas should be stabilized and vegetated as soon as practical to mitigate additional scouring into the ground surface. The groundhog holes should be filled as soon as practical (EA, 2016b).
4. The installation/stakeholders should agree upon a formalized set of background concentrations for metals in the groundwater.
5. Groundwater needs to be evaluated for the presence of PFCs to ensure there are no unacceptable risks; it is recommended that an evaluation of their presence in TAP groundwater should be conducted.
6. RSLs, particularly those which are below the readily obtainable environmental laboratory detection limits should not be used as groundwater monitoring criteria. One option is to modify the LTGM QAPP such that at a minimum, common laboratory MDLs are set as monitoring criteria for constituents lacking MCLs.
7. Groundwater monitoring results show no detections for VOCs above MCLs since 2003. Arsenic was detected at the TAP 2012-2014 just above the MCL (11, 11, 10.8 µg/L). Other VOC detections (naphthalene) since the last Five-Year Review are screened against RSLs, and are relatively low concentrations. All other detections were metals (iron, manganese),

also screened against the RSLs. Taking into account the recent and past groundwater results at the TAP, it is recommended that there should be a decrease in the frequency of sampling with the intent of eventual discontinuation of groundwater monitoring.

## **10.0 PROTECTIVENESS STATEMENT**

The remedy at Tipton Airfield Area OU is protective of human health and the environment. The remedy at Tipton Airfield Parcel OU is protective of human health and the environment. The remedy at Little Patuxent River MEC OU is protective of human health and the environment. Because the remedial actions at all OUs are protective, the site is protective of human health and the environment.

The remedy at the site is protective of human health and the environment. The elements of the remedy, (1) LUCs, (2) groundwater monitoring, and (3) periodic inspections protect the public from exposure to contaminated groundwater and MEC.

The effective implementation of LUCs has prevented extraction of groundwater except for its allowable use for environmental sampling. There is no residential development at TAP. There has been no excavation at the site without proper receipt of permission from the Army. There have been no activities that would interfere with the site remedy.

## **11.0 NEXT REVIEW**

The next periodic review is due on September 23, 2021, approximately five years from the date of this review. The review may be combined with the next Fort Meade BRAC Ordnance Demolition Area and Clean Fill Dump Five-Year Reviews.

**APPENDIX A:  
COMMUNITY NOTIFICATION**



US Army Corps  
of Engineers

**FORT GEORGE G. MEADE  
BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY  
NOTIFICATION OF FIVE-YEAR REVIEW**

This Public Notice is to inform the community of the U. S. Army Corps of Engineers' (USACE) intent to conduct the 2016 Five Year Review (5YR) for Clean Fill Dump (CFD), Ordnance Demolition Area (ODA) and Tipton Airfield Parcel (TAP), all of which are Fort George G. Meade (Fort Meade) 1998 Base Realignment and Closure (BRAC) properties. CFD and ODA are located on the Patuxent Research Refuge-North Tract (PRR-NT), administered by the U.S. Fish and Wildlife Service (USFWS). TAP is located south of Fort Meade and MD Route 32 and east of MD Route 198. The purpose of the 5YR is to determine if the remedy implemented when the Record of Decision (ROD) was signed for each site remains protective of human health and the environment.

**Constituents of Potential Concern (COPCs):** COPCs at the sites include various metals (arsenic, barium, cadmium, cobalt, lead), volatile organic compounds [VOCs: benzene, tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (DCE)], and Munitions and Explosives of Concern compounds [MEC: royal demolition explosive (RDX), 2,4,6-trinitrotoluene (TNT), 2-amino-4,6-dinitrotoluene (DNT), and 4-amino-2,6-DNT]. Some of these COPC are present in soils and groundwater at CFD, ODA and TAP, though no site contains all the COPCs. The COPC groundwater concentrations were slightly above the U.S. Environmental Protection Agency (EPA) safe drinking water Maximum Contaminant Levels (MCLs).

**Selected Remedies:** The selected remedies for CFD and TAP are No Further Action (NFA) except groundwater monitoring with land use controls (LUCs). The selected remedy for ODA is Monitored Natural Attenuation (MNA) with LUCs. The implemented LUCs prohibit: unauthorized extraction or use of the groundwater, unauthorized use of the sites and soil disturbance without prior Army approval.

**Comment Period:** The Army welcomes the public's comments on the sites. The 30-day public comment period is: April 18 to May 17, 2016. The Army will review the public comments. For further information, please contact:

Steve Cardon  
Fort Meade BRAC Environmental Coordinator  
Phone #: (301) 677-9178  
[Steven.C.Cardon.ctr@Mail.mil](mailto:Steven.C.Cardon.ctr@Mail.mil)

or

Mona D. Ponnappalli  
U.S. Army Corps of Engineers  
Phone #: (410) 962-3548  
[Mona.D.Ponnappalli@Usace.Army.mil](mailto:Mona.D.Ponnappalli@Usace.Army.mil)

Scheduled date of completion of the Final 5YRs is anticipated to be September 30, 2016. The public is invited to examine the previous Five Year Reviews online at:

<http://www.ftrmeade.army.mil/directorates/dpw/environment/bracLegacy/index.html>  
and at the Information Repository located at:

Fort Meade DPW - Environmental Management Division  
(IMND-MEA-PWE)  
85th Medical Battalion Ave., Building 32460  
Fort George G. Meade, MD 20755  
301-677-9648  
Hours: 7:30 am to 4:30 pm; Monday through Friday  
MD 16/043A Apr. 16

4105438





501 N. Calvert St., P.O. Box 1377  
Baltimore, Maryland 21278-0001  
tel: 410/332-6000  
800/829-8000

WE HEREBY CERTIFY, that the annexed advertisement of Order No 4105440

**Sold To:**

Dept. of the Army - CU00529790  
10 S Howard St  
Baltimore District Corps of Engineers  
Baltimore, MD 21201-2526

**Bill To:**

Dept. of the Army - CU00529790  
10 S Howard St  
Baltimore District Corps of Engineers  
Baltimore, MD 21201-2526

Was published in "CroftonWestCountyGazette", "Weekly", a newspaper printed and published in Anne Arundel County on the following dates:

Apr 14, 2016

The Baltimore Sun Media Group

By *[Signature]*

**FORT GEORGE G. MEADE  
BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY  
NOTIFICATION OF FIVE-YEAR REVIEW**

This Public Notice is to inform the community of the U.S. Army Corps of Engineers (USACE) intent to conduct the 2016 Five Year Review (SYR) for Clean-Fill Dump (CFD), Ordnance Demolition Area (ODA) and Tipton Airfield Parcel (TAP), all of which are Fort George G. Meade (Fort Meade) 1998 Base Realignment and Closure (BRAC) properties. CFD and ODA are located on the Patuxent Research Refuge-North Tract (PRR-NT), administered by the U.S. Fish and Wildlife Service (USFWS). TAP is located south of Fort Meade and MD Route 32 and east of MD Route 198. The purpose of the SYR is to determine if the remedy implemented when the Record of Decision (ROD) was signed for each site remains protective of human health and the environment.

**Constituents of Potential Concern (COPCs):** COPCs at the sites include various metals (arsenic, barium, cadmium, cobalt, lead), volatile organic compounds (VOCs: benzene, tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (DCE), and Munitions and Explosives of Concern compounds (MEC: royal demolition explosive (RDX), 2,4,6-trinitrotoluene (TNT), 2-amino-4,6-dinitrotoluene (DNT), and 4-amino-2,6-DNT). Some of these COPCs are present in soils and groundwater at CFD, ODA and TAP, though no site contains all the COPCs. The COPC groundwater concentrations were slightly above the U.S. Environmental Protection Agency (EPA) safe drinking water Maximum Contaminant Levels (MCLs).

**Selected Remedies:** The selected remedies for CFD and TAP are No-Further Action (NFA) except groundwater monitoring with land use controls (LUCs). The selected remedy for ODA is Monitored Natural Attenuation (MNA) with LUCs. The implemented LUCs prohibit: unauthorized extraction or use of the groundwater; unauthorized use of the sites and soil disturbance without prior Army approval.

**Comment Period:** The Army welcomes the public's comments on the sites. The 30-day public comment period is: April 18 to May 17, 2016. The Army will review the public comments. For further information, please contact:

Steve Cardon	or	Mona D. Ponnagalli
Fort Meade BRAC Environmental Coordinator		U.S. Army Corps of Engineers
Phone #: (301) 677-9178		Phone #: (410) 962-3548
Steven.C.Cardon.cu@mail.mil		Mona.D.Ponnagalli@usace.army.mil

Scheduled date of completion of the Final SYR is anticipated to be September 30, 2016. The public is invited to examine the previous Five Year Reviews online at: <http://www.ftmeade.army.mil/directorates/dpw/environment/bracLegacy/index.html> and at the Information Repository located at:

Fort Meade DPW - Environmental Management Division  
(IMND-MEA-PWE)  
85th Medical Battalion Ave., building 32460  
Fort George G. Meade, MD 20755  
301-677-9648  
Hours: 7:30 am to 4:30 pm, Monday through Friday  
BB/CW 16/043B Apr. 14

4105440



501 N. Calvert St., P.O. Box 1377  
Baltimore, Maryland 21278-0001  
tel: 410/332-6000  
800/829-8000

WE HEREBY CERTIFY, that the annexed advertisement of Order No 4105440

**Sold To:**

Dept. of the Army - CU00529790  
10 S Howard St  
Baltimore District Corps of Engineers  
Baltimore, MD 21201-2526

**Bill To:**

Dept. of the Army - CU00529790  
10 S Howard St  
Baltimore District Corps of Engineers  
Baltimore, MD 21201-2526

Was published in "The Bowie Blade", "Weekly", a newspaper printed and published in Prince Georges County on the following dates:

Apr 14, 2016

The Baltimore Sun Media Group

By

**FORT GEORGE G. MEADE**  
**BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY**  
**NOTIFICATION OF FIVE-YEAR REVIEW**

This Public Notice is to inform the community of the U. S. Army Corps of Engineers (USACE) intent to conduct the 2016 Five Year Review (SYR) for Clean Fill Dump (CFD), Ordnance Demolition Area (ODA) and Tipton Airfield Parcel (TAP), all of which are Fort George G. Meade (Fort Meade) 1998 Base Realignment and Closure (BRAC) properties. CFD and ODA are located on the Patuxent Research Refuge North Tract (PRR-NT), administered by the U.S. Fish and Wildlife Service (USFWS). TAP is located south of Fort Meade and MD Route 32 and east of MD Route 198. The purpose of the SYR is to determine if the remedy implemented when the Record of Decision (ROD) was signed for each site remains protective of human health and the environment.

**Constituents of Potential Concern (COPCs):** COPCs at the sites include various metals (arsenic, barium, cadmium, cobalt, lead, volatile organic compounds (VOCs, benzene, tetrahydroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (DCE)), and Munitions and Explosives of Concern compounds (MEC), royal demolition explosive (RDX), 2,4,6-trinitrotoluene (TNT), 2-amino-4,6-dinitrotoluene (DNT), and 4-amino-2,6-DNT). Some of these COPCs are present in soils and groundwater at CFD, ODA and TAP, though no site contains all the COPCs. The COPC groundwater concentrations were slightly above the U.S. Environmental Protection Agency (EPA) safe drinking water Maximum Contaminant Levels (MCLs).

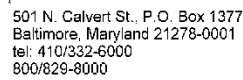
**Selected Remedies:** The selected remedies for CFD and TAP are No Further Action (NFA) except groundwater monitoring with land use controls (LUCs). The selected remedy for ODA is Monitored Natural Attenuation (MNA) with LUCs. The implemented LUCs prohibit unauthorized extraction or use of the groundwater, unauthorized use of the sites and soil disturbance without prior Army approval.

**Comment Period:** The Army welcomes the public's comments on the sites. The 30-day public comment period is April 18 to May 17, 2016. The Army will review the public comments. For further information, please contact:

Steve Cardon	or	Mona D. Ponnappalli
Fort Meade BRAC Environmental Coordinator		U.S. Army Corps of Engineers
Phone #: (301) 677-9178		Phone #: (410) 962-3548
Steven.C.Cardon.cj@Mail.mil		Mona.D.Ponnappalli@usace.army.mil

Scheduled date of completion of the final SYR is anticipated to be September 30, 2016. The public is invited to examine the previous Five Year Reviews online at: <http://www.fgmeade.army.mil/directories/dpw/environment/bracleagacy/index.html> and at the Information Repository located at:

Fort Meade DPW - Environmental Management Division  
(IMND-MEA-PWE)  
85th Medical Battalion Ave., Building 32460  
Fort George G. Meade, MD 20755  
301-677-9648  
Hours: 7:30 am to 4:30 pm, Monday through Friday  
BB/CW 16/0438 Apr. 14 4105440



**Sold To:**  
Dept. of the Army - CU00529790  
10 S Howard St  
Baltimore District Corps of Engineers  
Baltimore, MD 21201-2526

**Bill To:**  
Dept. of the Army - CU00529790  
10 S Howard St  
Baltimore District Corps of Engineers  
Baltimore, MD 21201-2526

Apr 16, 2016

By S. Williams

Legal Advertising

 **FORT GEORGE G. MEADE**  
**BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY**  
**NOTIFICATION OF FIVE-YEAR REVIEW**

This Public Notice is to inform the community of the U. S. Army Corps of Engineers' (USACE) intent to conduct the 2036 Five Year Review (5YR) for Clean Fill Dump (CFD), Ordnance Demolition Area (ODA) and Tipton Airfield Parcel (TAP), all of which are Fort George G. Meade (Fort Meade) 1998 Base Realignment and Closure (BRAC) properties. CFD and ODA are located on the Patuxent River National Refuge North Tract (PRK-NT), administered by the U.S. Fish and Wildlife Service (USFWS). TAP is located south of Fort Meade and MD Route 32 and east of MD Route 198. The purpose of the 5YR is to determine if the remedy implemented when the Record of Decision (ROD) was signed for each site remains protective of human health and the environment.

**Constituents of Potential Concern (COPCs):** COPCs at the sites include various metals (arsenic, barium, cadmium, cobalt, lead, volatile organic compounds (VOCs), benzene, tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (DCE)), and Munitions and Explosives of Concern compounds (MEC: royal demolition explosive (RDX), 2,4,6-trinitrotoluene (TNT), 2-amino-4,6-dinitrotoluene (DNT), and 4-amino-2,6-DNT). Some of these COPC are present in soils and groundwater at CFD, ODA and TAP, though no site contains all the COPCs. The COPC groundwater concentrations were slightly above the U.S. Environmental Protection Agency (EPA) safe drinking water Maximum Contaminant Levels (MCLs).

**Selected Remedies:** The selected remedies for CFD and TAP are No Further Action (NFA) except groundwater monitoring with land use controls (LUCS). The selected remedy for ODA is Monitored Natural Attenuation (MNA) with LUCS. The implemented LUCS prohibit: unauthorized extraction or use of the groundwater; unauthorized use of the sites and soil disturbance without prior Army approval.

**Comment Period:** The Army welcomes the public's comments on the sites. The 30-day public comment period is: April 18 to May 17, 2016. The Army will review the public comments. For further information, please contact:

Steve Cardon	or	Mona D. Ponnappalli
Fort Meade BRAC Environmental Coordinator		U. S. Army Corps of Engineers
Phone n. (301) 677-9178		Phone n. (410) 962-3548
Steven C.Cardon.ctr@Mail.mil		Mona.D.Ponnappalli@usace.army.mil

Scheduled date of completion of the Final 5YRs is anticipated to be September, 30<sup>th</sup> 2016. The public is invited to examine the previous Five Year Reviews online at: <http://www.ftrmeade.army.mil/directorates/dpw/environment/brac/legacy/index.html> and at the information Repository located at:

Fort Meade DPW - Environmental Management Division  
(IMND-MEA-PWE)  
85th Medical Battalion Ave., Building 3246Q  
Fort George G. Meade, MD. 20755  
301-677-9648  
Hours: 7:30 am to 4:30 pm; Monday through Friday  
MD 16/043A.Adr. 16

410543

## Legal or Agency Order Summaries for 4105440

Company: BSC-BSMG  
 Sold To #: CU00529790  
 Sold To Name: Dept. of the Army  
 PO #: Attn: Mona Ponnappalli  
 Description: Ft Meade Realignment  
 Comments:  
 Reference #:  
 Bill To #: CU00529790  
 Bill To Name: Dept. of the Army  
 Bill To Address: 10 S Howard St  
 Baltimore District Corps of Engineers  
 Baltimore, MD 21201-2526

Insertion #	Day	Pub date	Product type	Product	Section	Class	Zone	Status	Gross Price
01-0	Thursday	04/14/2016	Classified Listings	The Bowie Blade	NBS_Class_Leg als_Liners	11517	Full Run	Processed	299.00
02-0	Thursday	04/14/2016	Classified Listings	CroftonWestCountyG azette	NBS_Class_Leg als_Liners	11517	Full Run	Processed	299.00
03-0	Thursday	04/14/2016	Online	classified.capitalgaze te.com	capitalgazette.c om_Single	11517		Processed	0.00
04-0	Thursday	04/14/2016	Online	classified.MDDC.com _ACG	classified.MDD C.com_ACG	11517		Processed	0.00
<b>Total</b>									<b>598.00</b>

# Legal or Agency Order Summaries for 4105438

Company: BSC-BSMG  
 Sold To #: CU00529790  
 Sold To Name: Dept. of the Army  
 PO #: Attn:Mona Ponnappalli  
 Description: Ft Meade Realignment  
 Comments:  
 Reference #:  
 Bill To #: CU00529790

Bill To Name: Dept. of the Army  
 Bill To Address: 10 S Howard St  
 Baltimore District Corps of Engineers  
 Baltimore, MD 21201-2526

Insertion #	Day	Pub date	Product type	Product	Section	Class	Zone	Status	Gross Price
01-0	Saturday	04/16/2016	Classified Listings	Maryland Gazette	NBS_Class_Leg als_Liners	11517	Full Run	Invoiced	300.30
02-0	Saturday	04/16/2016	Online	classified.capitalgazet te.com	capitalgazette.c om_Single	11517		Invoiced	0.00
03-0	Saturday	04/16/2016	Online	classified.MDDC.com _ACG	classified.MDD C.com_ACG	11517		Invoiced	0.00
								<b>Total</b>	<b>300.30</b>

## **APPENDIX B: REFERENCES**

## REFERENCES

- Anne Arundel County, 2009. *2009 Anne Arundel County General Development Plan*. April. <http://www.aacounty.org/PlanZone/LongRange/GDP.cfm>.
- EA Engineering, Science, and Technology, Inc., PBC (EA), 2016a. *Final Long-Term Monitoring Report for 2015 Little Patuxent River Munitions and Explosives of Concern Survey, Patuxent Research Refuge, Fort George G. Meade, Maryland*. Prepared for U.S. Army Corps of Engineers, Baltimore District. February 16, 2016.
- EA, 2016b. *2015 Annual Maintenance Inspection Report Inactive Landfills 1 and 3 Fort George G. Meade Legacy Base Realignment and Closure Program Anne Arundel County, Maryland, Draft*. Prepared for U.S. Army Corps of Engineers, Baltimore District. January 2016.
- EA, 2015a. *Draft FGGM-007-R – Inactive Landfill No. 2, 2015 Site Specific Maintenance and Repairs Report, Fort George G. Meade, Maryland*. December 16, 2015.
- EA, 2015b. *Combined Groundwater Operable Units 2015 Long-Term Monitoring Report, Fort George G. Meade Legacy Base Realignment and Closure Program Anne Arundel County, Maryland, Draft*. Prepared for U.S. Army Corps of Engineers, Baltimore District. December 2015.
- EA, 2015c. *2015 Amendment to the Work Plan Addendum for Combined Groundwater Operable Units Long-Term Monitoring, Clean Fill Dump, Ordnance Demolition Area, Tipton Airfield Parcel, Fort George G. Meade, Maryland, Final*. May 26, 2015.
- EA, 2015d. *Combined Groundwater Operable Units 2014 Long-Term Monitoring Report Fort George G. Meade Legacy Base Realignment and Closure Program Anne Arundel County, Maryland, Final*. Prepared for U.S. Army Corps of Engineers, Baltimore District. May 2015.
- EA, 2015e. *Final 2014 Annual Maintenance Inspection Report, Inactive Landfills 1 & 3, Fort George G. Meade, Maryland*. Prepared for U.S. Army Corps of Engineers, Baltimore District. January 3, 2015.
- EA, 2014a. *Fort George G. Meade Legacy Base Realignment and Closure Program, Long-Term Monitoring Report, 2014 Little Patuxent River Sweep, Final*. December 2014.

- EA, 2014b. *Work Plan Addendum for Combined Groundwater Operable Units Long-Term Monitoring, Clean Fill Dump, Ordnance Demolition Area, Tipton Airfield Parcel, Fort George G. Meade, Maryland, Final.* December 2014.
- EA, 2014c. *Draft Final FGGM-007-R Inactive Landfill No. 2 Site Specific Maintenance and Repairs Report, Fort George G. Meade, Maryland.* September 2014.
- EA, 2014d. *Work Plan Addendum for Little Patuxent River, Long Term Monitoring, Munitions and Explosives of Concern Survey, Final.* August 2014.
- Fort George G. Meade (FGGM), 2015a. *Draft 2015 Annual Maintenance Inspection Report Inactive Landfill No. 2 (FGGM-007-R) at Fort George G. Meade, Maryland.* December 31, 2015.
- FGGM, 2015b. *Final 2014 Annual Maintenance Inspection Report, Inactive Landfill No. 2 (FGGM-007-R) at Fort George G. Meade, Maryland.* May 12, 2015.
- FGGM, 2013a. *Final Annual Maintenance Inspection Report Inactive Landfill No. 2 (FGGM-007-R), Fort George G. Meade, Maryland.* December 23, 2013.
- FGGM, 2013b. *FY2013 Fort George G. Meade, Army Defense Environmental Restoration Program, Installation Action Plan.* November 2013.
- FGGM, 2012. *Final Annual Maintenance Inspection Report Inactive Landfill No. 2 (FGGM-007-R), Fort George G. Meade, Maryland.* December 13, 2012.
- FGGM, 1999. *Final Record of Decision Tipton Airfield Parcel Operable Unit.* July 20, 1999.
- FGGM, 1998a. *Final Record of Decision Tipton Airfield Area Operable Unit.* December 30, 1998.
- FGGM, 1998b. *Decision Document, Safety Precautions to be taken at Tipton Airfield, Fort George G. Meade, Maryland.* July 1998.
- FGGM, 1998c. *Decision Document Addendum, Safety Precautions to be taken at Tipton Airfield, Fort George G. Meade, Maryland.* November 1998.
- FGGM, 1997. *Amendment to Explosives Safety Submission for Tipton Army Airfield, Fort Meade, Maryland.*
- Greene, Paul, 2011. *Instrument Assisted Visual Inspection of the Tipton Airfield Inactive Landfill 3 and Ball Field.* Memorandum to Department of the Army. Explosive Safety Manager, USACE, Baltimore District Office. May 2011.
- ICF Kaiser Engineers, Inc. (Kaiser), 1998a. *Remedial Investigation Report for Inactive Landfills 1, 2, 3 and Clean Fill Dump.* August 1998.



Kaiser, 1998b. *Helicopter Hangar Area and Fire Training Area, Remedial Investigation Report*. October 1998.

Plexus-PARS Joint Venture (Plexus-PARS, 2014). *Final Maintenance and Repair Completion Report, Inactive Landfill 1 and Inactive Landfill 3, Tipton Parcel and DOI BRAC Areas, Fort George G. Meade, Maryland*. November 2014.

Plexus-PARS, 2014. *Soil Analytical Report for Clean Fill Source at Quarry Landfill, Repair and Maintenance at IAL1 and IAL3, Fort George G. Meade, Maryland*. April 2014.

Radian International (Radian), 1999. *Final Helicopter Hangar Area Removal Action Report*. Prepared for U. S. Army Corps of Engineers, Baltimore District. March 23, 1999.

Radian, 1998. *Fire Training Area Removal Action Report*. Prepared for U.S. Army Corps of Engineers, Baltimore District. October 26, 1998.

State of Maryland, 2001. *Quitclaim Deed for Surplus Airport Property*. July 2001.

URS Group, Inc. (URS), 2014a. *Final Combined Groundwater Operable Units (OUs) Long-Term Monitoring (LTM) Report, 2013 Sampling Event, Anne Arundel County, MD, Tipton Airfield Parcel, Clean Fill Dump, Ordnance Demolition Area, Fort George G. Meade Legacy Base Realignment and Closure Program*. Prepared for U.S. Army Corps of Engineers, Baltimore District. July 9, 2014.

URS, 2014b. *Explanation of Significant Difference Report, Tipton Airfield Parcel, Anne Arundel County, MD. Final*. Prepared for U.S. Army Corps of Engineers, Baltimore District. May 8, 2014.

URS, 2013a. *Final 2013 Annual Maintenance Inspection Report Inactive Landfills 1 and 3, Anne Arundel County, MD, Fort George G. Meade Legacy Base Realignment and Closure Program*. Prepared for U.S. Army Corps of Engineers, Baltimore District. December 6, 2013.

URS, 2013b. *2012 Final Combined Groundwater Operable Units (OUs) Long-Term Monitoring (LTM) Report Anne Arundel County, MD, Tipton Airfield Parcel, Clean Fill Dump, Ordnance Demolition Area, Fort George G. Meade Legacy Base Realignment and Closure Program*. Prepared for U.S. Army Corps of Engineers, Baltimore District. August 2013.

URS, 2012. *Final 2012 Annual Maintenance Inspection Report Inactive Landfills 1 and 3, Anne Arundel County, MD, Fort George G. Meade Legacy Base Realignment and Closure Program*. Prepared for U.S. Army Corps of Engineers, Baltimore District. November 16, 2012.

URS, 2011a. *Second Five Review, Tipton Airfield Parcel, Anne Arundel County, MD*. Prepared for U.S. Army Corps of Engineers, Baltimore District. September 22, 2011.

- URS, 2011b. *Final 2010 Maintenance Inspection Report, Inactive Landfills 1, 2, and 3, Tipton Airfield Parcel, Fort George G. Meade, Laurel, Maryland*. Prepared for U.S. Army Corps of Engineers, Baltimore District. April 8, 2011.
- URS, 2010a. *Final Inactive Landfills 1 & 2, 2009 Annual Maintenance Inspection Report, Anne Arundel County, MD*. Prepared for U. S. Army Corps of Engineers, Baltimore District. February 2010.
- URS, 2010b. *Final 2008 Maintenance Inspection Report, Inactive Landfills 1 & 2, Tipton Airfield Parcel, Fort George G. Meade, Laurel, Maryland*. Prepared for U.S. Army Corps of Engineers, Baltimore District. April 23, 2010.
- URS, 2010c. *Final Long Term Monitoring Report, Tipton Airfield Parcel, Operable Unit, Anne Arundel County, Maryland, June 2009 Sampling Event*. June 29, 2010.
- U.S. Army Corps of Engineers (USACE), 2014. *Fort George G. Meade Legacy Base Realignment and Closure Program, Long-Term Monitoring Report, 2013 Little Patuxent River Sweep*. Final. April, 2014.
- USACE, 2002a. *Ordnance and Explosives Reference Guide for Department of Army Base Realignment and Closure Act Sites*. June 2002.
- USACE, 2001. *Fort George G. Meade Long-Term Groundwater Monitoring Plan for Tipton Airfield Parcel (TAP) Operable Unit (OU), Final Document*. June 2001.
- USACE, 1999. *Finding of Suitability to Transfer, Tipton Airfield Anne Arundel County, Maryland*.
- USACE, 1995. *Explosive Safety Submission for Ordnance and Explosives Removal and Property Release Tipton Airfield, Fort Meade*. June 1995.
- U.S. Army Environmental Center (USAEC), 1994. *Fort George G. Meade Base Closure Parcel Site Inspection Study Addendum*.
- USAEC, 1992. *Fort George G. Meade Base Closure Parcel Site Inspection Study, Vols. I and II. Final*. EA Engineering, Science, and Technology, Inc. Sparks, MD 21152.
- USAEC, 1989. *Enhanced Preliminary Assessment Report: Fort George G. Meade, Maryland. Final*. Environmental Research Division, Argonne, IL. October 1989.
- USA Environmental, Inc., 2014a. *Fort George G. Meade Legacy Base Realignment and Closure Program, Long-Term Monitoring Report, 2014 Little Patuxent River Sweep. Final*. December 2014.
- USA Environmental, Inc., 2014b. *Fort George G. Meade Legacy Base Realignment and Closure Program, Long-Term Monitoring Report, 2013 Little Patuxent River Sweep, Final*. April 2014.

- USA Environmental, Inc., 2013. *Fort George G. Meade Legacy Base Realignment and Closure Program, Long-Term Monitoring Report, 2012 Little Patuxent River Sweep, Final*. January 2013.
- USA Environmental, Inc., 2012. *Fort George G. Meade Legacy Base Realignment and Closure Program, Long-Term Monitoring Report, 2011 Little Patuxent River Sweep, Final*. May 2012.
- USA Environmental, Inc., 2011. *Fort George G. Meade Legacy Base Realignment and Closure Program, Long-Term Monitoring Report, 2010 Little Patuxent River Sweep, Final*. February 2011.
- USA Environmental, Inc., 2007b) *Ordnance and Explosives (OE) Removal Action at the Little Patuxent River, Fort George G. Meade, Maryland, Work Plan Addendum 1, Revision 6*. August 31, 2007.
- USA Environmental, Inc., 2002. *Site Specific Final Report for the Non-Time Critical Ordnance and Explosives (OE) Removal Action for Little Patuxent River and Tipton Airfield, Landfill 3*. January 2002.
- USA Environmental, Inc. 2001. *Final Work Plan Non-Time Critical Ordnance and Explosives (OE) Removal Action at the Little Patuxent River, Fort George G. Meade, Maryland*. February 16, 2001.
- U.S. Environmental Protection Agency (USEPA), 2010. *Regional Screening Levels for Chemical Contaminants at Superfund Sites Table*, dated November, 2010.  
<http://www.epa.gov/reg3hwmd/risk/human/index.htm>
- USEPA, 2009. *National Primary Drinking Water Standards*, EPA 816-F-09-004,  
[www.water.epa.gov/drinkcontaminants/index.cfm](http://www.water.epa.gov/drinkcontaminants/index.cfm). May.
- USEPA, 2001. *Comprehensive Five-Year Review Guidance*. EPA 540-R-O 1-007. June 2001.  
<http://www.epa.gov/superfund/accomp/5year/index.html>

**APPENDIX C:**  
**MEMORANDUM FOR RECORD,**  
**USACE SITE INSPECTION AND PHOTOS**  
**MAY 8, 2015**

STAFF OFFICIAL: Mona D. Ponnappalli, Project Engineer, CENAB-EN-HT, (410) 962-3548,  
Richard Braun, Risk Assessor, CENAE-EN-HT 410-962-2842

PROJECT VISITED: Tipton Airfield Parcel (TAP) Fort Meade, BRAC Property, Odenton,  
Maryland

DATE OF VISIT: 8 May 2015, 1300 to 1500

PRINCIPAL CONTACT for TIPTON AIRFIELD PARCEL (TAP) Site Visit: Mike Wassel, Tipton  
Airport Manager (410) 222-6815

PURPOSE OF VISIT: To perform a site visit for Five Year Review of Tipton Airfield Parcel (a  
Fort George G. Meade BRAC site). The five sub-areas are: (1) Inactive Landfill 1, (2) Inactive  
Landfill 2, (3) Inactive Landfill 3, (4) Helicopter Hanger Area and (5) Fire Training Area.

#### **FINDINGS:**

Met Mike Wassel and Steve Cardon (BRAC Environmental Coordinator, (BEC)) at Inactive  
Landfill 1, near the Fish and Wildlife Service Hunter Control Station 1 of the Patuxent Research  
Refuge, North, Bald Eagle Drive. The day was warm (mid 80s F) and sunny with light breezes.

The first site, Inactive Landfill 1 (IAL 1) consists of overgrown grassy fields over the landfill cap,  
bordered by large deciduous trees and other vegetation along the northern, northeastern, southern  
and southwestern perimeter. A significant length of the eastern perimeter of the site, beyond the  
Inactive Landfill 1 fill and cap, but within the site boundary, is the Little Patuxent River.

Mr. Wassel conducted the party northeast, towards the Patuxent River, first. We walked and used  
the rutted road that the monitoring well samplers used. Then we walked southward towards MW-1-  
4 and MW-23. The well covers were locked and in good condition, however, they were not clearly  
labeled according to the names given them in the groundwater reports. Also, there were only 3  
bollards (not four), around MW-1-4. The soil cover here is termed a "MEC cover", not a formal  
soil cover with specified and graded depths of soil. No major depressions, erosion, cracks, seeps or  
ponding was observed. No fill or unexploded ordnance or animal burrows were observed, either.  
This landfill does not have benches or venting. There is no fence surrounding IAL 1. No warning  
signs were posted, identifying IAL 1. We returned, walking, to Fish and Wildlife Service Hunter  
Control Station 1.

The next site examined was the Helicopter Hanger Area (HHA). The northern and western portions  
of the HHA is behind a chain link fence. The southern half of the HHA is occupied by a Tipton  
Airfield Building and it is a parking lot. There is a paved road running North-South, within the  
eastern third of the HHA. The area behind the chain link fence has deciduous trees growing on it.  
On part of the western edge of the HHA is the Patuxent River. Monitoring Wells HHAMW-9 and

HHAMW-11 were observed from outside the fence. The well covers were locked and in good condition, however, they were not clearly labeled according to the names given them in the groundwater reports. Also, there were only 3 bollards (not four), around HHAMW-11. There are warning signs posted, identifying HHA as a contaminated area.

Next we conducted a visual inspection of the Fire Training Area (FTA). The FTA site consists of overgrown grassy fields, bordered by large deciduous trees and other vegetation along the northern, eastern, and western perimeter. The southern border is the road, General Aviation Drive, with a grassy culvert between the road and the FTA. No water was observed in the ditch, but it is likely a natural drainage channel. Monitoring Wells FTAMW-3 and FTAMW-7 are on the northern edge of the FTA. The monitoring wells were observed from the road. The wells had closed covers. A warning sign, identifying the FTA as a contaminated area was posted.

The fourth site to be examined at TAP is Inactive Landfill 3 (IAL 3). IAL 3 covers much of the Tipton runways, the area between the runways, the land beneath the main buildings of Tipton Airport (offices and airplane hangers) and the airplane parking areas. IAL 3 is large enough that various monitoring well locations on it were examined on foot, but motor transport was required between monitoring wells. The terrain is a gently rolling plain. The surface is either asphalt, buildings or long (~15-inches high) grass.

Monitoring wells MW3-5 and MW3-6 were examined and then MW3-1 and MW3-2 were examined. All of these wells are flush mount wells, whose outer caps were in good condition. It was difficult locating the wells because of the length of the grass. I remarked that the ride over the cap was quite bumpy and rolling. I was informed by Messers. Wassel and Cardon that it had been much more hilly and rutted, with exposed soil, before cap repair a few months ago. No major depressions, erosion, cracks, seeps or ponding was observed. No fill or unexploded ordnance or animal burrows were observed, either. This landfill does not have benches or venting. There is no fence surrounding IAL 3. There were warning signs posted at the outer edge, near the airport buildings, identifying a hazardous waste area.

IAL2 was not walked over. It was photographed from Wildlife Loop Road on its southern border. The perimeter of IAL2 facing Wildlife Loop Road was guarded by a tall (~7-feet high) chain link fence with barbed wire on top, and environmental area warning signs posted on it. IAL2 is still retained by the Army (Fort Meade).

CONTACT INFORMATION: If there are any questions concerning this Resume of Staff Visit, please contact the undersigned at (410) 962-3548.

Mona D. Ponnappalli  
Chemical Engineer  
RID Section, EMDC Branch





Photo 1. Tire tracks leading into IAL 1.



Photo 2. Monitoring Wells at IAL 1.





Photo 3. Tipton Airfield Parcel, IAL 1, Rebar sticking out of the ground.



Photo 4. Little Patuxent River and Trees near It, East of TAP, IAL1.





Photo 5. Monitoring Well HHAMW-11, at Helicopter Hanger Area (HHA), With Only Three Bollards.



Photo 6. Fence Around HHA, AST on Parking Lot on Right, Monitoring Well HHAMW-9 in the Background.





Photo 7. Fence Around HHA Separates It From the Parking Lot.



Photo 8. Large, Abandoned AST, Near HHA Fence





Photo 9. Fire Training Area (FTA) Field With Monitoring Well FTAMW-7.



Photo 10. IAL3 Hangers, In the Distance. Note long Grass



Photo 11. TAP IAL3, Monitoring Well MW3-1, and Part of TAP Runway



Photo 12. TAP, IAL3, Runway. Note that IAL3, on either side of runway is relatively flat.





Photo 13. TAP, IAL3, Eastern Hangers, Viewed From Near MW3-1.



Photo 14. TAP, Monitoring Well MW3-6 In the Lush Grass of IAL3.





Photo 15. IAL 2 From Wildlife Loop Road.



Photo 16. IAL 2 on Right; PRR-NT on Left of Fence. Barriers Around IAL2.





Photo 17. IAL 2 Fence and Wildlife Loop Road.

**APPENDIX D:  
SITE INSPECTION CHECKLIST AND INTERVIEWS**



## 5 Year Review, Site Inspection Checklist

I. SITE INFORMATION	
<b>Site name:</b> Tipton Airfield Parcel (TAP) : Inactive Landfill 1 (IAL1), IAL2, IAL3, Helicopter Hanger Area (HHA), Fire Training Area (FTA)	<b>Date of inspection:</b> May 8, 2015
<b>Location and Region:</b> Odenton, MD	<b>EPA ID/CERCLIS No.:</b> MD0910020567
<b>Agency, office, or company leading the five-year review:</b> US Army Corps of Engineers (USACE)	<b>Weather/temperature:</b> Sunny, Warm, 80s F
<b>Remedy Includes:</b> Check all that apply <input checked="" type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Groundwater Monitoring of VOCs _X_ Other _The site remedy is No Further Action with groundwater monitoring._____	
<b>Inspection team roster:</b> Mona D. Ponnappalli, Chemical Engineer, Steve Cardon, BRAC Environmental Coordinator, Michael Wassel, Manager, Tipton Airport.	
II. INTERVIEWS (Check all that apply)	
<b>1. Manager, Tipton Airport</b> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div>Michael Wassel</div> <div>Manager, Tipton Airport</div> <div>May 8, 2015</div> <div>410-222-6815</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>Name</div> <div>Title</div> <div>Date</div> <div>Phone no.</div> </div> <div style="margin-top: 5px;">             Problems, suggestions: Interview record at end of Site Inspection Checklist.           </div>	
<b>2.</b> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div>Name</div> <div>Title</div> <div>Date</div> <div>Phone no.</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>Name</div> <div>Title</div> <div>Date</div> <div>Phone no.</div> </div> <div style="margin-top: 5px;">             Problems, suggestions:           </div>	
<b>3.</b> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div>Name</div> <div>Title</div> <div>Date</div> <div>Phone no.</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>Name</div> <div>Title</div> <div>Date</div> <div>Phone no.</div> </div> <div style="margin-top: 5px;">             Problems, suggestions:           </div>	

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Maryland Department of the Environment

Contact: Elisabeth Green MDE Remedial Project Manager July 22, 2015 410-537-3346  
 Name Title Date Phone no.

1800 Washington Blvd., Suite 625, Baltimore, MD 21230-1719

Problems/Suggestions: Interview record at end of Site Inspection Checklist.

Agency Fort Meade DPW, Environmental Division

Contact: Steven Cardon BRAC Environmental Coordinator July 16, 2015 301-677-9178  
 Name Title Date Phone no.

Problems/Suggestions: Interview record at end of Site Inspection Checklist.

Agency EPA Region III

Contact: Robert Stroud EPA Regional Project Manager August 26, 2015 410-305-2748  
 Name Title Date Phone no.

Problems/Suggestions: Interview record at end of Site Inspection Checklist.

4. **Other interviews (optional)**

Name, Agency & Title:

Date & Phone No

Name, Agency & Title:

Date & Phone No

Name, Agency & Title:

Date & Phone No

Name, Agency & Title:

Date & Phone No

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	<b>O&amp;M Documents</b> O&M manual As-built drawings Maintenance logs Remarks <i>O&amp;M is annual physical inspection of IAL 1, 2, 3. Surface sweep for MEC at IAL 3, every five years. Next sweep: 2016.</i>	<u>Readily available</u> Readily available Readily available	Up to date Up to date Up to date	N/A <u>N/A</u> <u>N/A</u>
2.	<b>Site-Specific Health and Safety Plan</b> Contingency plan/emergency response plan Remarks _____	Readily available Readily available	Up to date Up to date	<u>N/A</u> <u>N/A</u>
3.	<b>O&amp;M and OSHA Training Records</b> Remarks _____	Readily available	Up to date	<u>N/A</u>
4.	<b>Permits and Service Agreements</b> Air discharge permit Effluent discharge Waste disposal, POTW Other permits _____ Remarks _____	Readily available Readily available Readily available Readily available	Up to date Up to date Up to date Up to date	<u>N/A</u> <u>N/A</u> N/A <u>N/A</u>
5.	<b>Gas Generation Records</b> N/A			
6.	<b>Settlement Monument Records</b> Remarks _____	Readily available	Up to date	<u>N/A</u>
7.	<b>Groundwater Monitoring Records</b> Remarks _____	<u>Readily available</u>	<u>Up to date</u>	N/A
8.	<b>Leachate Extraction Records</b> Remarks _____	Readily available	Up to date	<u>N/A</u>
9.	<b>Discharge Compliance Records</b> Air Water (effluent) Remarks _____	Readily available Readily available	Up to date Up to date	<u>N/A</u> <u>N/A</u>
10.	<b>Daily Access/Security Logs</b> Remarks _____	Readily available	Up to date	<u>N/A</u>

IV. O&M COSTS										
1.	<b>O&amp;M Organization</b> State in-house _____ Contractor for State _____ PRP in-house _____ Contractor for PRP _____ Federal Facility in-house _____ Contractor for Federal Facility _____ Other <u>EA Engineering</u>									
2.	<b>O&amp;M Cost Records</b> Readily available <u>Yes</u> Up to date <u>Yes</u> Funding mechanism/agreement in place <u>Yes</u> Original O&M cost estimate _____ Breakdown attached _____  Total annual cost by year for review period if available									
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">From <u>10/1/10</u></td> <td style="width: 15%;">To <u>9/30/11</u></td> <td style="width: 20%; text-align: center;"><u>\$118,000</u></td> <td style="width: 50%;"></td> </tr> <tr> <td style="text-align: center;"><small>Date</small></td> <td style="text-align: center;"><small>Date</small></td> <td style="text-align: center;"><small>Total cost</small></td> <td></td> </tr> </table>	From <u>10/1/10</u>	To <u>9/30/11</u>	<u>\$118,000</u>		<small>Date</small>	<small>Date</small>	<small>Total cost</small>		Breakdown attached
From <u>10/1/10</u>	To <u>9/30/11</u>	<u>\$118,000</u>								
<small>Date</small>	<small>Date</small>	<small>Total cost</small>								
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">From <u>10/1/11</u></td> <td style="width: 15%;">To <u>9/30/12</u></td> <td style="width: 20%; text-align: center;"><u>\$120,000</u></td> <td style="width: 50%;"></td> </tr> <tr> <td style="text-align: center;"><small>Date</small></td> <td style="text-align: center;"><small>Date</small></td> <td style="text-align: center;"><small>Total cost</small></td> <td></td> </tr> </table>	From <u>10/1/11</u>	To <u>9/30/12</u>	<u>\$120,000</u>		<small>Date</small>	<small>Date</small>	<small>Total cost</small>		Breakdown attached
From <u>10/1/11</u>	To <u>9/30/12</u>	<u>\$120,000</u>								
<small>Date</small>	<small>Date</small>	<small>Total cost</small>								
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">From <u>10/1/12</u></td> <td style="width: 15%;">To <u>9/30/13</u></td> <td style="width: 20%; text-align: center;"><u>\$349,000</u></td> <td style="width: 50%;"></td> </tr> <tr> <td style="text-align: center;"><small>Date</small></td> <td style="text-align: center;"><small>Date</small></td> <td style="text-align: center;"><small>Total cost</small></td> <td></td> </tr> </table>	From <u>10/1/12</u>	To <u>9/30/13</u>	<u>\$349,000</u>		<small>Date</small>	<small>Date</small>	<small>Total cost</small>		Breakdown attached
From <u>10/1/12</u>	To <u>9/30/13</u>	<u>\$349,000</u>								
<small>Date</small>	<small>Date</small>	<small>Total cost</small>								
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">From <u>10/1/13</u></td> <td style="width: 15%;">To <u>9/30/14</u></td> <td style="width: 20%; text-align: center;"><u>\$53,000</u></td> <td style="width: 50%;"></td> </tr> <tr> <td style="text-align: center;"><small>Date</small></td> <td style="text-align: center;"><small>Date</small></td> <td style="text-align: center;"><small>Total cost</small></td> <td></td> </tr> </table>	From <u>10/1/13</u>	To <u>9/30/14</u>	<u>\$53,000</u>		<small>Date</small>	<small>Date</small>	<small>Total cost</small>		Breakdown attached
From <u>10/1/13</u>	To <u>9/30/14</u>	<u>\$53,000</u>								
<small>Date</small>	<small>Date</small>	<small>Total cost</small>								
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">From <u>10/1/14</u></td> <td style="width: 15%;">To <u>9/30/15</u></td> <td style="width: 20%; text-align: center;"><u>\$48,000</u></td> <td style="width: 50%;"></td> </tr> <tr> <td style="text-align: center;"><small>Date</small></td> <td style="text-align: center;"><small>Date</small></td> <td style="text-align: center;"><small>Total cost</small></td> <td></td> </tr> </table>	From <u>10/1/14</u>	To <u>9/30/15</u>	<u>\$48,000</u>		<small>Date</small>	<small>Date</small>	<small>Total cost</small>		Breakdown attached
From <u>10/1/14</u>	To <u>9/30/15</u>	<u>\$48,000</u>								
<small>Date</small>	<small>Date</small>	<small>Total cost</small>								
3.	<b>Unanticipated or Unusually High O&amp;M Costs During Review Period</b> Describe costs and reasons: <u>IAL 1 &amp; IAL 3 had erosion repairs in 2014; contracted the money in FY2013.</u>									
V. ACCESS AND INSTITUTIONAL CONTROLS      Applicable    N/A										
A. Fencing										

1.	<b>Fencing damaged</b> Remarks <u>IAL 1 does not have a fence. IAL 2 has a 7' high fence with barbed wire on top and a locked gate. IAL 3 is in a fenced area (with signs), office bldg &amp; hangars.</u>	Location shown on site map <u>Gates secured</u> N/A
B. Other Access Restrictions <u>HHA has a partial fence. FTA does not have a fence.</u>		
1.	<b>Signs and other security measures</b> Remarks <u>All five TAP Areas (IAL 1, 2, 3, HHA, FTA) except for IAL 1, have warning signs.</u>	Location shown on site map    N/A

C. Institutional Controls (ICs)				
1.	<b>Implementation and enforcement</b>			
	Site conditions imply ICs <del>not</del> properly implemented	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
	Site conditions imply ICs <del>not</del> being fully enforced	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
	<i>IC is properly implemented as observed at Site Inspection.</i>			
	Type of monitoring (e.g., self-reporting, drive by)			
	Frequency			
	Responsible party/agency			
	Contact			
	Name	Title	Date	Phone no.
	Reporting is up-to-date	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
	Reports are verified by the lead agency	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
	Specific requirements in deed or decision documents have been met	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
	Violations have been reported	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
	Other problems or suggestions:	Report attached		
2.	<b>Adequacy</b>	<input checked="" type="radio"/> ICs are adequate	<input type="radio"/> ICs are inadequate	<input type="radio"/> N/A
	Remarks			
<b>D. General</b>				
1.	<b>Vandalism/trespassing</b>	Location shown on site map	<input checked="" type="radio"/> No vandalism evident	
	Remarks			
2.	<b>Land use changes on site</b>	<input checked="" type="radio"/> N/A		
	Remarks			
3.	<b>Land use changes off site</b>	<input checked="" type="radio"/> N/A		
	Remarks			
<b>VI. GENERAL SITE CONDITIONS</b>				
<b>A. Roads</b> <input checked="" type="checkbox"/> Applicable				
1.	<b>Roads damaged</b>	<input checked="" type="radio"/> Roads adequate		
	Remarks			

**VII. LANDFILL COVERS** Applicable ☒ N/A

**A. Landfill Surface**

1. **Settlement** (Low spots) Location shown on site map ☒ Settlement not evident ☒ have a soil cover (~18" deep), but it is not an engineered landfill cover.  
Areal extent \_\_\_\_\_ Depth \_\_\_\_\_  
Remarks \_\_\_\_\_

2. **Cracks** Location shown on site map ☒ Cracking not evident  
Lengths \_\_\_\_\_ Widths \_\_\_\_\_ Depths \_\_\_\_\_  
Remarks \_\_\_\_\_

3. **Erosion** Location shown on site map ☒ Erosion not evident  
Areal extent \_\_\_\_\_ Depth 6"  
Remarks Rutted tire tracks from Annual Sampling at IAL 1.

4. **Holes** Location shown on site map ☒ Holes not evident  
Areal extent \_\_\_\_\_ Depth \_\_\_\_\_  
Remarks \_\_\_\_\_

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established ☒ No signs of stress  
Trees/Shrubs (indicate size and locations on a diagram)  
Remarks \_\_\_\_\_

6. **Alternative Cover** (armored rock, concrete, etc.) ☒ N/A  
Remarks \_\_\_\_\_

7. **Bulges** Location shown on site map ☒ Bulges not evident  
Areal extent \_\_\_\_\_ Height \_\_\_\_\_  
Remarks \_\_\_\_\_

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident

Wet areas Location shown on site map Areal extent \_\_\_\_\_  
Ponding Location shown on site map Areal extent \_\_\_\_\_  
Seeps Location shown on site map Areal extent \_\_\_\_\_  
Soft subgrade Location shown on site map Areal extent \_\_\_\_\_  
Remarks \_\_\_\_\_

9. **Slope Instability** Slides Location shown on site map ☒ No evidence of slope instability  
Areal extent \_\_\_\_\_  
Remarks \_\_\_\_\_

**B. Benches** Applicable ☒ N/A No benches at IAL 1, 2, 3.  
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** Location shown on site map ☒ N/A or okay  
Remarks \_\_\_\_\_

2. **Bench Breached** Location shown on site map ☒ N/A or okay  
Remarks \_\_\_\_\_

3. **Bench Overtopped** Location shown on site map ☒ N/A or okay  
Remarks \_\_\_\_\_

3. **Bench Overtopped** Location shown on site map N/A or okay  
Remarks \_\_\_\_\_

C. **Letdown Channels** Applicable N/A

*No letdown channels at IAL 1, 2, 3.*  
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** Location shown on site map No evidence of settlement  
Areal extent \_\_\_\_\_ Depth \_\_\_\_\_  
Remarks \_\_\_\_\_

2. **Material Degradation** Location shown on site map No evidence of degradation  
Material type \_\_\_\_\_ Areal extent \_\_\_\_\_  
Remarks \_\_\_\_\_

3. **Erosion** Location shown on site map No evidence of erosion  
Areal extent \_\_\_\_\_ Depth \_\_\_\_\_  
Remarks \_\_\_\_\_

4. **Undercutting** Location shown on site map No evidence of undercutting  
Areal extent \_\_\_\_\_ Depth \_\_\_\_\_  
Remarks \_\_\_\_\_

5. **Obstructions** Type \_\_\_\_\_ No obstructions  
Location shown on site map Areal extent \_\_\_\_\_  
Size \_\_\_\_\_  
Remarks \_\_\_\_\_

6. **Excessive Vegetative Growth** Type \_\_\_\_\_  
No evidence of excessive growth  
Vegetation in channels does not obstruct flow  
Location shown on site map Areal extent \_\_\_\_\_  
Remarks \_\_\_\_\_

N/A

N/A

**D. Cover Penetrations** (Applicable) N/A

**1. Gas Vents** Active Passive

Properly secured/locked Functioning Routinely sampled Good condition

Evidence of leakage at penetration Needs Maintenance

N/A

Remarks

Not Applicable = N/A

**2. Gas Monitoring Probes**

Properly secured/locked Functioning Routinely sampled Good condition

Evidence of leakage at penetration Needs Maintenance N/A

Remarks

N/A

**3. Monitoring Wells** (within surface area of landfill)

Properly secured/locked Functioning Routinely sampled Good condition

Evidence of leakage at penetration Needs Maintenance N/A

Remarks

MW conditions: Caps intact and locks present. Needs paint and better I.D. labels.

**4. Leachate Extraction Wells**

Properly secured/locked Functioning Routinely sampled Good condition

Evidence of leakage at penetration Needs Maintenance N/A

Remarks

N/A

**5. Settlement Monuments** Located Routinely surveyed N/A

Remarks

N/A

**E. Gas Collection and Treatment** (Applicable) N/A

**1. Gas Treatment Facilities**

Flaring Thermal destruction Collection for reuse

Good condition Needs Maintenance

Remarks

No gas collection or treatment at IAL 1, 2, 3.

**2. Gas Collection Wells, Manifolds and Piping**

Good condition Needs Maintenance

Remarks

N/A

**3. Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

Good condition Needs Maintenance N/A

Remarks

N/A



<b>F. Cover Drainage Layer</b> Applicable <u>N/A</u>	
1. <b>Outlet Pipes Inspected</b> Functioning <u>N/A</u>	
Remarks	<u>N/A</u>
2. <b>Outlet Rock Inspected</b> Functioning <u>N/A</u>	
Remarks	<u>N/A</u>
<b>G. Detention/Sedimentation Ponds</b> Applicable <u>N/A</u>	
1. <b>Siltation</b> Areal extent _____ Depth _____ <u>N/A</u>	
Siltation not evident	
Remarks	<u>N/A</u>
2. <b>Erosion</b> Areal extent _____ Depth _____	
Erosion not evident	
Remarks	
3. <b>Outlet Works</b> Functioning <u>N/A</u>	
Remarks	
4. <b>Dam</b> Functioning <u>N/A</u>	
Remarks	<u>N/A</u>
<b>H. Retaining Walls</b> Applicable <u>N/A</u>	
1. <b>Deformations</b> Location shown on site map Deformation not evident	
Horizontal displacement _____	Vertical displacement _____
Rotational displacement _____	
Remarks	<u>N/A = Not Applicable</u>
2. <b>Degradation</b> Location shown on site map Degradation not evident	
Remarks	
<b>I. Perimeter Ditches/Off-Site Discharge</b> Applicable <u>N/A</u>	
1. <b>Siltation</b> Location shown on site map Siltation not evident	
Areal extent _____	Depth _____
Remarks	<u>N/A</u>

2. <b>Vegetative Growth</b>	Location shown on site map	N/A
Vegetation does not impede flow		
Areal extent	Type	
Remarks		
3. <b>Erosion</b>	Location shown on site map	Erosion not evident
Areal extent	Depth	
Remarks		N/A
4. <b>Discharge Structure</b>	Functioning	N/A
Remarks		

**VIII. VERTICAL BARRIER WALLS** Not Applicable N/A

1. **Settlement** Location shown on site map Settlement not evident

Areal extent \_\_\_\_\_ Depth \_\_\_\_\_

Remarks \_\_\_\_\_

**2. Performance Monitoring**

Type of monitoring \_\_\_\_\_

Performance not monitored

Frequency \_\_\_\_\_ Evidence of breaching \_\_\_\_\_

Head differential \_\_\_\_\_

Remarks \_\_\_\_\_

N/A

**IX. AIR SPARGING**

Applicable

N/A

**A. Air Sparging Wells**

Applicable

N/A

**1. Wells**

Good condition

All required wells properly operating

All required wells located

Properly secured/locked

Routinely sampled

Needs Maintenance

Remarks \_\_\_\_\_

**2. Delivery System**

**Pumps, Pipelines, Valves, Valve Boxes, Wellhead Plumbing, and Electrical**

Good condition

Needs Maintenance

Not Applicable

Remarks \_\_\_\_\_

**3. Spare Parts and Equipment**

Readily available

Good condition

Requires upgrade

Needs to be provided

Remarks \_\_\_\_\_

**B. Air Sparging Performance Monitoring**

Applicable

Not Applicable = N/A

**1. Performance Monitoring**

Type of monitoring \_\_\_\_\_

Performance not monitored

Frequency \_\_\_\_\_

Head differential \_\_\_\_\_

Remarks \_\_\_\_\_

**C. Monitoring Data**

**1. Monitoring Data**

Is routinely submitted on time

N/A

Is of acceptable quality

**2. Monitoring data suggests:**

Groundwater plume is effectively contained

Contaminant concentrations are declining

Remarks \_\_\_\_\_

<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b> Applicable <u>N/A</u>	
<b>A. Groundwater Extraction Wells, Pumps, and Pipelines</b> Applicable N/A	
<b>1. Pumps, Wellhead Plumbing, and Electrical</b>	
Good condition	All required wells properly operating
Needs Maintenance	N/A
Remarks <u>Not Applicable = N/A</u>	
<b>2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b>	
Good condition	Needs Maintenance
Remarks <u>N/A</u>	
<b>3. Spare Parts and Equipment</b>	
Readily available	Good condition
Requires upgrade	Needs to be provided
Remarks _____	
<b>B. Surface Water Collection Structures, Pumps, and Pipelines</b> Applicable N/A	
<b>1. Collection Structures, Pumps, and Electrical</b>	
Good condition	Needs Maintenance
Remarks _____	
<b>2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b>	
Good condition	Needs Maintenance
Remarks _____	
<b>3. Spare Parts and Equipment</b>	
Readily available	Good condition
Requires upgrade	Needs to be provided
Remarks <u>N/A</u>	

**C. Treatment System** Applicable N/A

**1. Treatment Train** (Check components that apply)

Metals removal Oil/water separation Bioremediation

Air stripping Carbon adsorbers

Filters

Additive (e.g., chelation agent, flocculent)

Others

Good condition Needs Maintenance

Sampling ports properly marked and functional

Sampling/maintenance log displayed and up to date

Equipment properly identified

Quantity of groundwater treated annually

Quantity of surface water treated annually

Remarks

**2. Electrical Enclosures and Panels** (properly rated and functional)

N/A Good condition Needs Maintenance

Remarks

*Not applicable = N/A*

**3. Tanks, Vaults, Storage Vessels**

N/A Good condition Proper secondary containment Needs Maintenance

Remarks

**4. Discharge Structure and Appurtenances**

N/A Good condition Needs Maintenance

Remarks

**5. Treatment Building(s)**

N/A Good condition (esp. roof and doorways) Needs repair

Chemicals and equipment properly stored

Remarks

**6. Monitoring Wells** (pump and treatment remedy)

Properly secured/locked Functioning Routinely sampled Good condition

All required wells located Needs Maintenance N/A

Remarks

*N/A*

<b>D. Monitoring Data</b> 1. Monitoring Data Is routinely submitted on time	- The remedy for all five areas of TAP (IAL 1, 2, 3, HHA and FTA) is No further Action (NFA), with IC and groundwater monitoring. Is of acceptable quality
2. Monitoring data suggests: Groundwater plume is effectively contained	Contaminant concentrations are declining
<b>E. Monitored Natural Attenuation</b>	No plume was ever identified.
1. <b>Monitoring Wells</b> (natural attenuation remedy) Properly secured/locked Functioning Routinely sampled Good condition All required wells located Needs Maintenance N/A Remarks	
<b>X. OTHER REMEDIES</b> If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction None	
<b>XI. OVERALL OBSERVATIONS</b>	
<b>A. Implementation of the Remedy</b> Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.). TAP, 5 areas: IAL 1, 2, 3, HHA, FTA is NFA with IC and groundwater monitoring. IC prohibits: excavation, groundwater use other than for environmental sampling, residences w/o a risk assessment survey. In addition: Surface MEC sweeps at IAL 3 every five years (next: 2016) and annual visual inspections for IAL 1, 2, 3. Remedy is fully implemented.	
<b>B. Adequacy of O&amp;M</b> Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. Remedy is working acceptably. No vandalism or trespassing was observed or reported. No unpermitted groundwater use and no residences were observed or reported. Annual groundwater monitoring and landfill inspections occur.	

<b>C.</b>	<b>Early Indicators of Potential Remedy Problems</b>
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.	
<b>D.</b>	<b>Opportunities for Optimization</b>
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.	

See interviews following this page, with:

- 1) Michael Wassel, Tipton Airport Manager
- 2) Steve Cardon, BRAC Environmental Coordinator
- 3) Robert Stroud, Remedial Project Manager, EPA Region III
- 4) Elisabeth Green, Remedial Project Manager, Maryland Department of the Environment

Michael Wassel, Tipton Airport Manager (410-222-6815)

Post-Site Visit Interview at TAP Conference Room

Date/Time: Friday, May 8, 2015 @ 1430 to 1445

Participants: Mona D. Ponnappalli, Michael Wassel

Ms. Ponnappalli reviewed the remedy of the FGGM BRAC site Tipton Airfield Parcel (TAP), for the groundwater and UXO Operating Units (OUs), on behalf of Fort Meade BRAC. The TAP includes: Inactive Landfills 1, 2, 3, Helicopter Hanger Area (HHA) and Fire Training Area (FTA). The remedy is No Further Action (NFA) with IC and groundwater monitoring. The IC prohibits: excavation, groundwater use other than environmental sampling and residential use without a risk assessment survey. Additionally: surface MEC sweeps at IAL 3 every five years (next: 2016) and annual visual inspections for IAL 1, 2 and 3. Mr. Wassel agreed with Ponnappalli's description. Their overall impression of the project was that the NFA with IC and groundwater monitoring remedy was functioning as expected. The groundwater IC is functioning as intended – no one is extracting the groundwater except the contractor for the annual groundwater investigation as part of the Long Term Groundwater Monitoring Plan (LTGM). Specific questions below.

1. What is your overall impression of the remedial action and long-term monitoring activities at TAP? (General sentiment)

**Mike Wassel feels that the remedial action (IC and surface sweeps of IAL 3) and LTGM are proceeding smoothly at TAP.**

2. Do you feel that the land-use controls at the TAP are adequately communicated to the public?

**Mike Wassel feels that the land-use controls at the TAP are adequately communicated to the public.**

3. There isn't a continuous on-Site presence for remedial activities and/or O & M. Please describe staff and frequency of Site inspections and activities.



**Monitoring well sampling and general soil cover inspection, annually, by the contractor, usually occurs in the summer. The samplers are a two-person team. The IAL 3 sweeps (every five years) are contracted before the sweep.**

4. What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

**The contaminants of potential concern have low concentrations. Annual groundwater monitoring seems unnecessary – FGGM-BRAC is hoping to close the LTGM at TAP.**

5. Are you aware of any problems or concerns associated with on-going monitoring and maintenance activities? Do you feel well informed about activities associated with the remedy for the TAP?

**Mr. Wassel had no concerns. He noted that the settlement at IAL 1 and 3 was repaired in 2014.**

6. Is the remedy functioning as expected? How well is the remedy performing?

**See answer to Question 1.**

7. Have there been significant changes in the O&M requirements or unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

**There was erosion observed at IAL 1 and 3 in 2012 and 2013. It was repaired in 2014.**

8. Have there been any complaints, violations (state or federal), vandalism/emergency response/trespassing incidents or other activities related to the site, requiring a response by your office since the last Five Year Review of the Site? If so, please give details of the events and results of the responses.

**Mr. Wassel is not aware of any such instances.**

9. Are you aware of any community concerns regarding the TAP, its administration, or its remedy (No Further Action with groundwater monitoring)? If so, please give details.

**Mr. Wassel is not aware of any such concerns.**

10. Do you have any comments, suggestions, or recommendations regarding the Site's management or operation?

**Mr. Wassel had no suggestions regarding TAP's environmental management or operation.**

Steve Cardon, CHMM  
BRAC Environmental Coordinator  
Fort Meade DPW - Environmental Division  
(IMND-MEA-PWE)  
4215 Taylor Ave; Suite 5115  
Fort George G. Meade, MD 20755-7058  
(Office) 301-677-9178  
(Fax) 301-677-9001  
[steven.c.cardon.ctr@mail.mil](mailto:steven.c.cardon.ctr@mail.mil)

Steve Cardon, CHMM, BRAC Environmental Coordinator (BEC), Fort Meade DPW -  
Environmental Division (IMND-MEA-PWE)

INTERVIEW

Phone Interview, Thursday, July 16, 2015 @ 1100 to ~ 1130

Participants: Mona D. Ponnappalli and Steve Cardon

Ms. Ponnappalli reviewed the remedy of the FGGM-BRAC site: Tipton Airfield Parcel (TAP). The remedy is NFA, with Institutional Controls (IC) and groundwater monitoring. There is a Tipton Airfield Decision Document (July 1998) and DD Amendment (November 1998), which imposes Institutional Controls (IC), as part of the remedy. TAP has five sub-sites/areas: Inactive Landfills 1, 2, 3 (IAL 1, 2, 3), Helicopter Hanger Area (HHA) and Fire Training Area (FTA). Mr. Cardon agreed with Ponnappalli's description. Mr. Cardon's overall impression of the project is that the IC remedy is functioning as expected.

1. What is your overall impression of the project?

**Steve Cardon (BEC) feels that the TAP's remedy continues to be protective of human health and the environment.**

2. Is the remedy functioning as expected? How well is the remedy performing?

**Steve Cardon believes that the ICs are functioning as intended. No one is using groundwater from the FGGM-BRAC TAP area, except for environmental monitoring by the government appointed contractor. There is no excavation of soils to a depth of four feet or below, or below paved surfaces, without the prior written approval of the Government with the exception of emergency repair of existing utilities. There is no residential use of TAP. Mr. Cardon believes that the**

**groundwater VOCs are very low already, at the TAP monitoring wells. He would like to close out groundwater monitoring at TAP, but can't because of occasional detections of metals and VOCs above the MCLs.**

3. What effects have Site operations had on the surrounding community?

**Steve Cardon believes that the effects of TAP operation on the surrounding community are minimal. He is not aware of any problems or concerns associated with on-going monitoring and maintenance activities. The people most affected by the ICs are the people working at TAP, and they seem aware of the restrictions.**

4. Are you aware of any community concerns regarding the Site or its operation and administration? If so, please give details.

**Steve Cardon is not aware of any community concerns. He stated that the Army has an active RAB that meets bi-monthly.**

5. Are you aware of any events, incidents, or activities at the Site such as vandalism, trespassing or emergency responses from local authorities, since the last Five Year Review of the Site? If so, please give details.

**There was an emergency response incident when a small private airplane crash landed at IAL 1 on February 8, 2015. Two people were extricated from the plane and taken to a hospital with non-life threatening injuries; no one on the ground was hurt. Steve Cardon is not aware of any other incidents at TAP.**

6. Have there been any complaints, violations, or other incidents related to the Site requiring a response by your office since the last Five Year Review of the Site? If so, please give details of the events and results of the responses.

**Steve Cardon is not aware of any complaints or violations, at TAP.**

7. What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

**Steve Cardon states that the VOCs are slowly decreasing. He feels that trend will be more apparent with more data points due to the change from biennial to annual sampling. There are occasional detections of metals above MCL that are probably due to the background level of metals. (Same as answer to Question 2.)**

8. Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines in the last five years? Please describe changes and impacts, if there are any.

**There was maintenance of IAL 1 and IAL 3 in April and August 2014, respectively. At IAL1, trees and brush on the landfill cap were cut down to a height of no more than one inch above the ground surface, two rutted road tracks (~800 square-feet, total), were repaired and existing vegetation was mowed. At IAL3, settlement areas (trenches) on the landfill cover were repaired and vegetation was re-established to allow for positive drainage on the landfill.**

**A change to O & M is that the sampling frequency was changed from biennial to annual, starting in 2012.**

9. Have there been unexpected O&M difficulties or costs at the Site in the last five years? If so, please give details.

**No unexpected O & M difficulties or costs at the Site, other than what is discussed in question 8.**

10. There isn't a continuous on-Site presence for remedial activities and/or O & M. Please describe staff and frequency of Site inspections and activities.

**Monitoring well sampling and general soil cover inspection, annually, by the contractor, usually occurs in the summer. The samplers are a two-person team.**

11. Have there been opportunities to optimize O&M, or sampling efforts?

**No.**

12. Do you feel well informed about the Site's activities and progress?

**Yes.**

13. Do you have any comments, suggestions, or recommendations regarding the Site's management or operation?

**The Army, MDE and the EPA should agree on the details of a background level for contaminants, especially metals, in Fort Meade and Fort Meade, BRAC, and perform the survey. Perhaps that will enable the Army to show that the occasional metals concentration fluctuations are background concentrations.**

CERCLA Five Year Interview, Mr. Robert Stroud, EPA Project Manager  
FGGM-BRAC, Tipton Airfield Parcel, Third Five-Year Review

The U.S. Army Corps of Engineers, Baltimore District is doing a Five Year Review of the Tipton Airfield Parcel (TAP), a Fort Meade BRAC site. The remedy for the site is LUCs and annual groundwater monitoring. Part of the Five Year Review process is to seek information from interested parties, hence this questionnaire.

<<Form (below) received: Friday, October 23, 2015 @ 1557>>

1. What is your overall impression of the remedy and long-term monitoring activities at TAP? (General sentiment)

**The remedy and LTM activities are working as planned.**

2. Are you aware of any community concerns regarding the TAP, its administration, or its remedy [LUCs and annual Long Term Groundwater Monitoring (LTGM)] ? If so, please give details.

**I am not aware of any community concerns. The Army has an active RAB that meets bi-monthly.**

3. What effects have site operations at TAP, had on the surrounding community?

**None that I am aware of.**

4. Do you feel that the land-use controls at the TAP are adequately communicated to the public?

**Yes any member of the public can attend a RAB meetings. The meetings are advertised in local papers.**

5. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

**None that I am aware of.**

6. Do you feel well informed about TAP site activities and progress?

**Yes the army does a great job with that.**

7. Do you have any comments, suggestions, or recommendations regarding the TAP management or operation?

**I have no issues with the management and operation at the TAP.**

Name: **Robert Stroud**

Title: **Remedial Project Manager**

Contact Information (Office address, E-mail and Phone number): **701 Mapes Rd. Ft. Meade, MD 20755 [stroud.robert@epa.gov](mailto:stroud.robert@epa.gov) 410-305-2748**

---



CERCLA Five Year Interview, Ms. Elisabeth Green, MDE Project Manager  
FGGM-BRAC, Tipton Airfield Parcel, Third Five-Year Review

The U.S. Army Corps of Engineers, Baltimore District is doing a Five Year Review of the Tipton Airfield Parcel (TAP), a Fort Meade BRAC site. The remedy for the site is LUCs and annual long term groundwater monitoring (LTGM).. Part of the Five Year Review process is to seek information from interested parties, hence this questionnaire and interview.

<<Interview: Wednesday, October 7, 2015 @ 1107 (duration: 7 minutes)>>

<<Participants: Elisabeth (Lis) Green, MDE and Mona D. Ponnappalli, USACE-NAB>>

1. What is your overall impression of the remedial action and long-term monitoring activities at TAP? (General sentiment)

**Ms. Ponnappalli reviewed the remedy of the Tipton Airfield Parcel: LUCs and annual LTGM. Ms. Green agreed with Ponnappalli's description. Ms. Lis Green's overall impression of TAP was that the remedy was functioning according to plan. Ms. Green also states that she receives groundwater sampling reports on TAP regularly from the FGGM-BRAC.**

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the TAP? If so, please give purpose and results.

**Ms. Green has not been to the site to conduct inspections or view sampling. She is satisfied with the groundwater sampling reports she receives from the Army.**

3. Are you aware of any problems or concerns associated with on-going monitoring and maintenance activities? Do you feel well informed about activities associated with the remedy for the TAP?

**Ms. Lis Green is not aware of any problems or concerns associated with on-going monitoring and maintenance activities. Ms. Green feels well informed about activities associated with the remedy for the TAP.**

4. Have there been any complaints, violations, or other incidents related to the TAP requiring a response by your office? If so, please give details of the events and results of the responses.

**MDE has had no complaints, violations, or other incidents related to the TAP, which required a response by them.**

5. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

**Ms. Lis Green is not aware of events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities. (She was not aware of the private airplane that crashed in IAL 1, in 2014.)**

6. What effects have site operations at TAP, had on the surrounding community?

**Ms. Lis Green thinks that site operations at TAP have minimal effect on the surrounding community.**

7. Are you aware of any community concerns regarding the TAP, its administration, or its remedy (LUCs and annual LTGM)? If so, please give details.

**Ms. Lis Green is not aware of any community concerns regarding the TAP, its administration, or its remedy.**

8. Do you feel that the land-use controls at the TAP are adequately communicated to the public?

**As far as she knows, Ms. Lis Green believes that the land-use controls at TAP are adequately communicated to the public. The people most affected by the LUCs, particularly the excavation requirements are the people who work for Tipton airfield.**

**Ms. Green agreed that there were no MEC/UXO incidents when Inactive Landfill 3 (IAL 3) underwent maintenance repairs [soil cover placed in areas of subsidence (trenches) between the runways], in the summer of 2014. Therefore, the excavation requirements must have been adequately conveyed to the contractors who performed the IAL 3 repairs.**

9. Do you feel well informed about TAP site activities and progress?

**Ms. Lis Green feels well informed about TAP site activities and progress.**

10. Do you have any comments, suggestions, or recommendations regarding the TAP management?

**Ms. Lis Green has no comments, suggestions, or recommendations regarding the TAP, now that IAL 3 has been repaired. Ms. Green feels that the remedy is working effectively and that the groundwater samples (LTGM), are being taken regularly.**

Name: Elisabeth Green, Ph.D.

Title: Remedial Project Manager, Maryland Department of the Environment,  
Federal Facilities Division, Land Restoration Program

Office Address: 1800 Washington Blvd., Ste. 625, Baltimore, MD 21230-1719

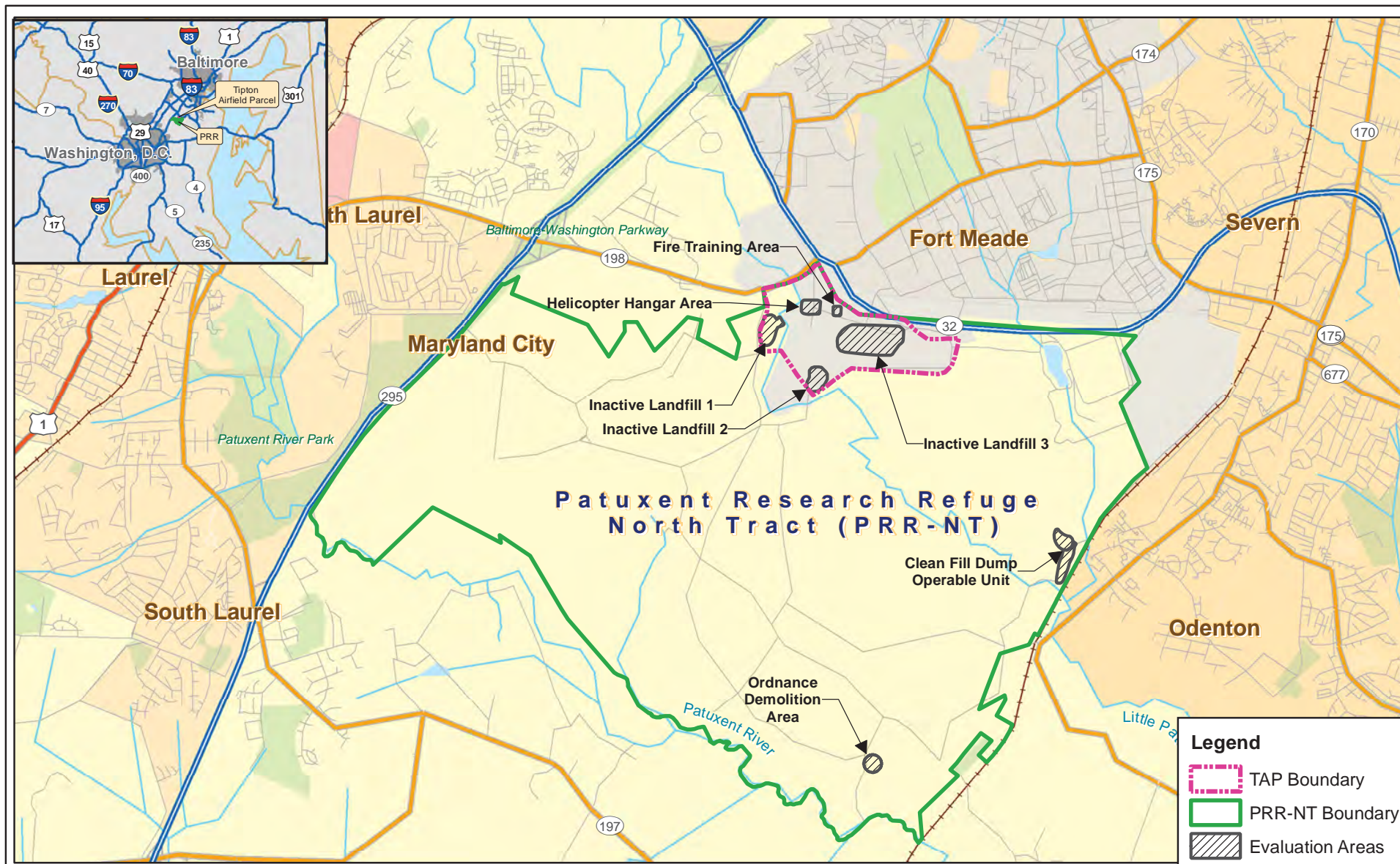
Contact Information (E-mail and Phone number):

Phone: 410-537-3346      [EGreen@mde.state.md.us](mailto:EGreen@mde.state.md.us)



## **APPENDIX E: FIGURES**

## **LIST OF FIGURES**

Figure 1	General Location of Fort George G. Meade and Tipton Airfield Parcel
Figure 2	Site Location Map
Figure 3	Geologic Cross Section in the Vicinity of TAP
Figure 4	Shallow Groundwater Elevation Map, June 2014, Tipton Airfield Parcel
Figure 5	Little Patuxent River Long Term Monitoring Overview Map
Figure 6	2014 MCL Exceedances, Tipton Airfield Parcel
Figure 7	2013 MCL Exceedances, Tipton Airfield Parcel
Figure 8	2012 MCL Exceedances, Tipton Airfield Parcel



CLIENT		USACE, Baltimore District		
PROJ		Tipton Airfield Parcel		
SOURCE	ESRI Street Maps 9.2	GIS:	TB	11/15/13
SCALE	1:60,000	CHECKED:	BE	08/26/13
FILE	G:\Projects\Fort_Meade\Tipton_Inactive_Landfills\Projects\TiptonLTM-insetandFigure2_2011.mxd	PROJ MGR:	BE	08/26/13


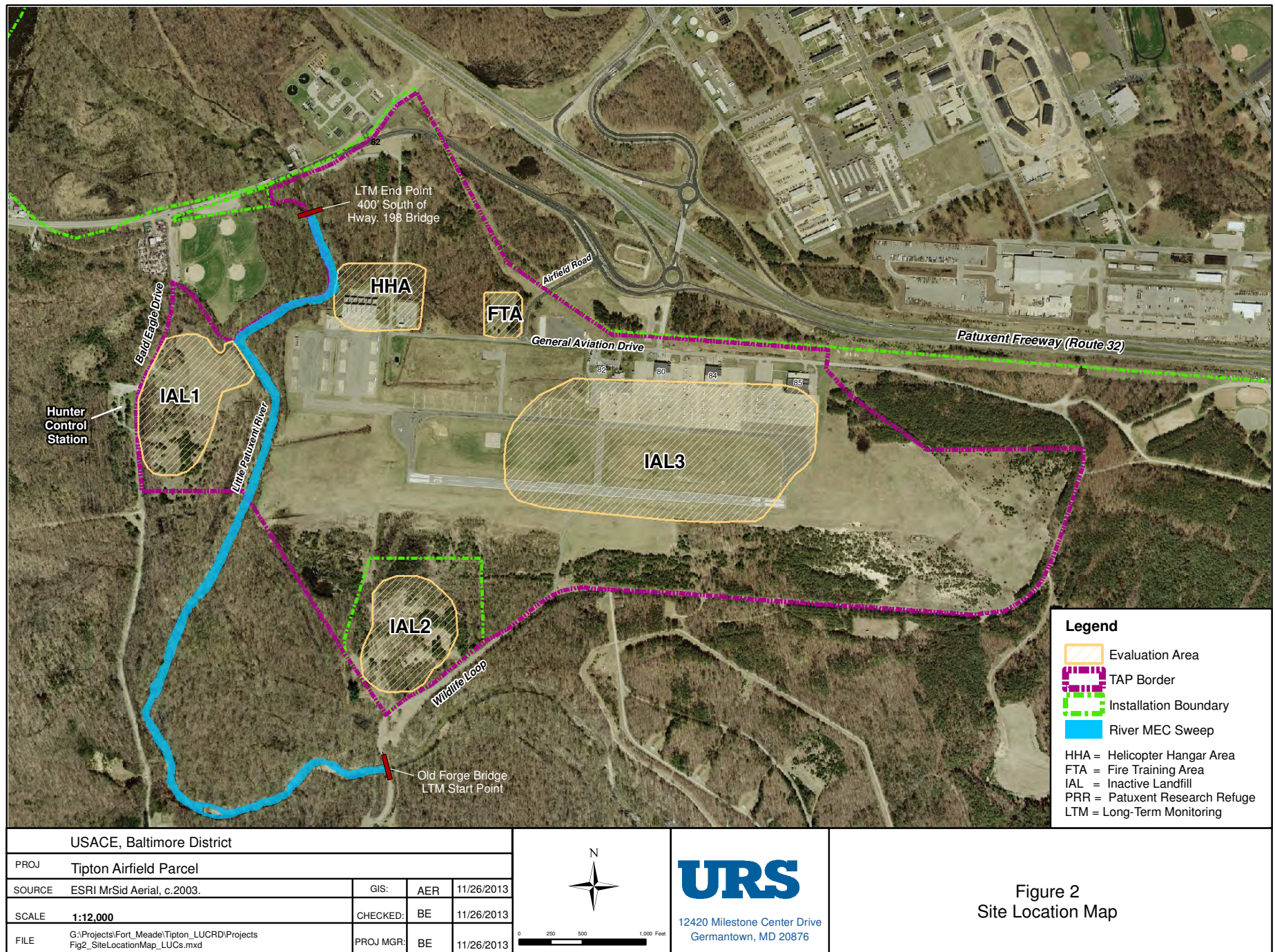
  
12420 Milestone Center Drive  
Germantown, MD 20876

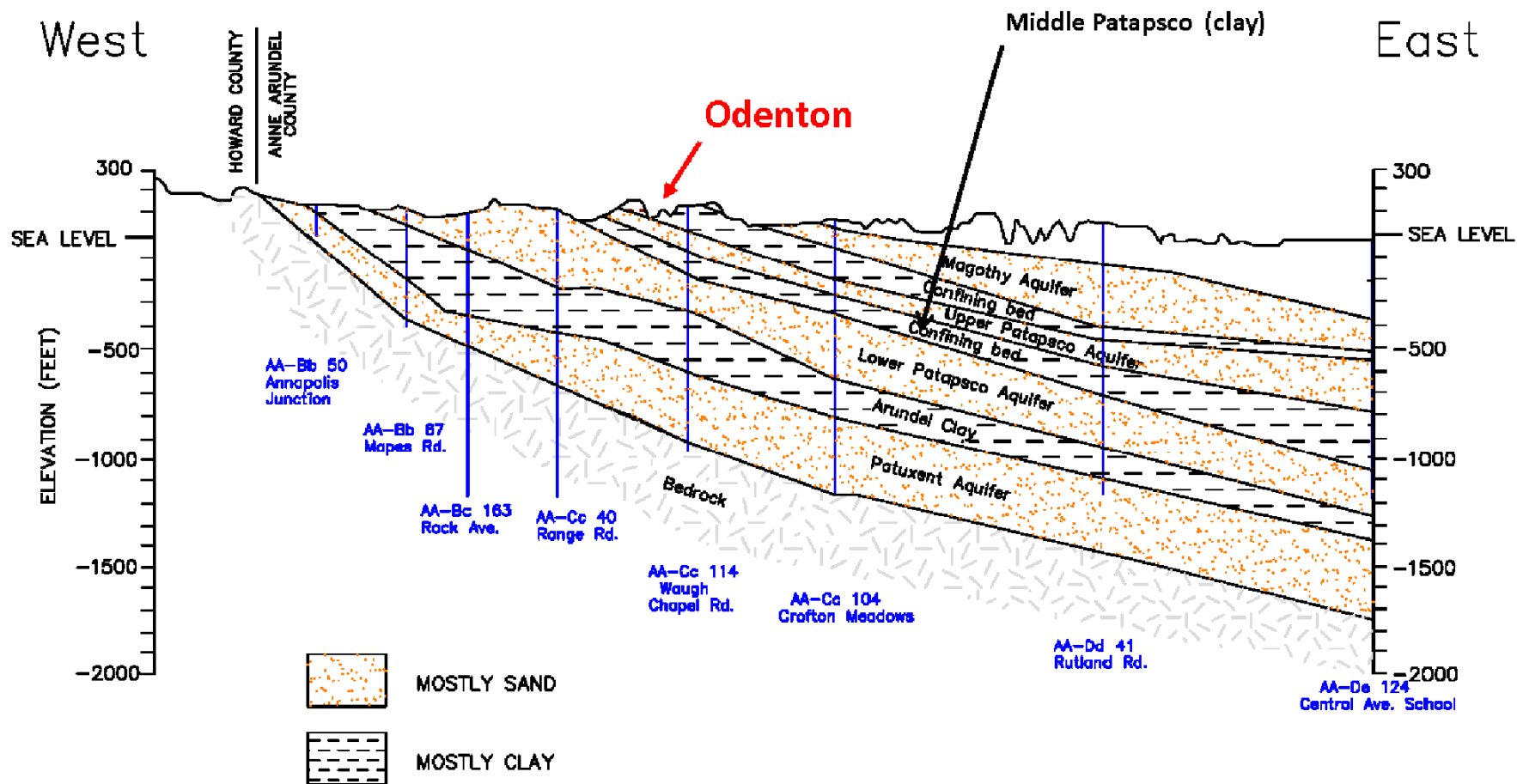
Figure 1

General Location of Fort Meade, Clean Fill Dump, Ordnance Demolition Area, Tipton Airfield Parcel, and Patuxent Research Refuge - North Tract










Source: EMI Federal Corporation. August 2007. Fort George G. Meade Closed Sanitary Landfill Groundwater Remedial Investigation

CLIENT		USACE, Baltimore District		
PROJ		Tipton Airfield Parcel		
REVISION NO	0	GIS BY	AER	11/26/2013
SCALE		CHK BY	BE	11/26/2013
G:\Projects\Fort_Meade\Tipton_LUCRD\Projects\Fig4_Cross-Section.mxd		PM	BE	11/26/2013



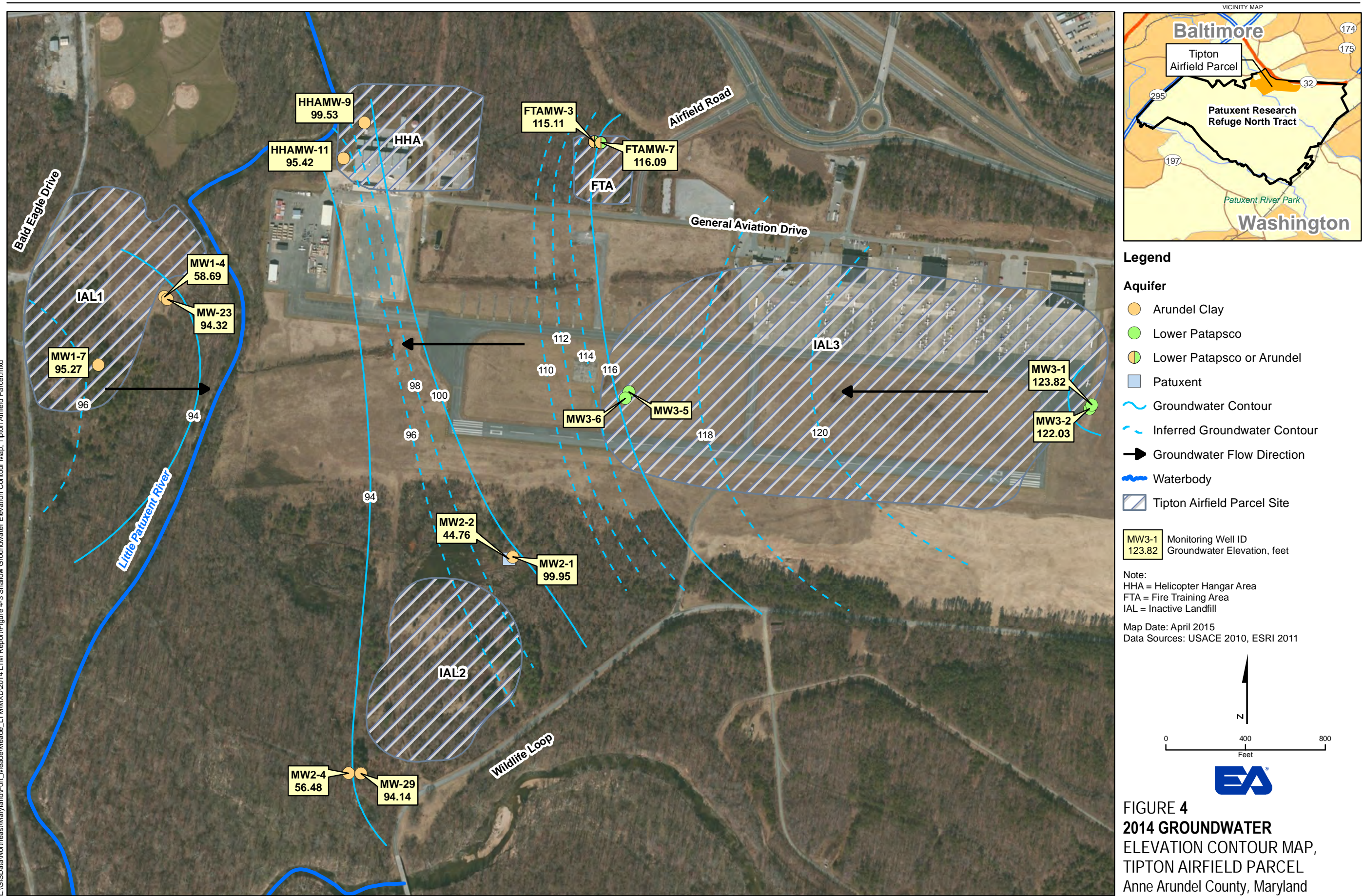
12420 Milestone Center Drive  
Germantown, MD 20876

Figure 3

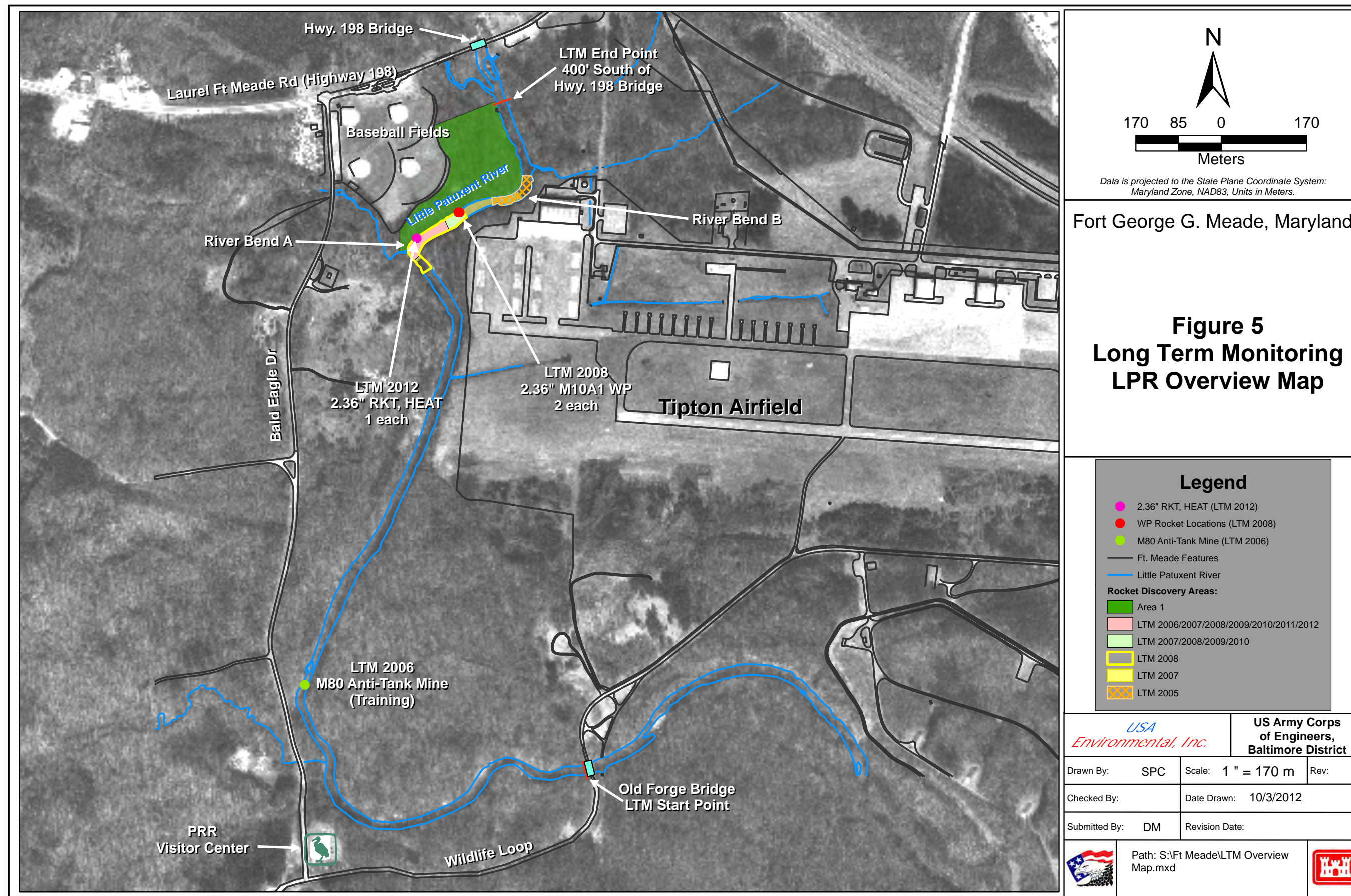
Geologic Cross Section in the Vicinity of TAP



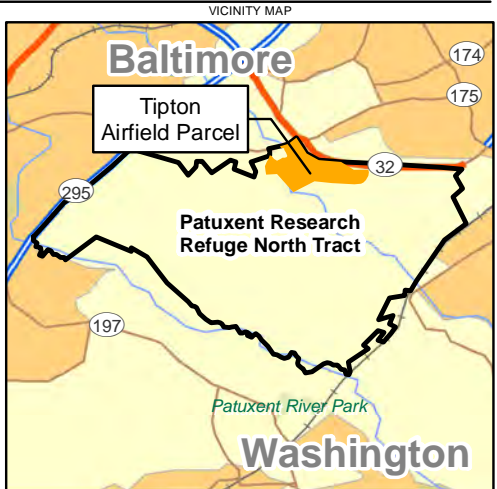
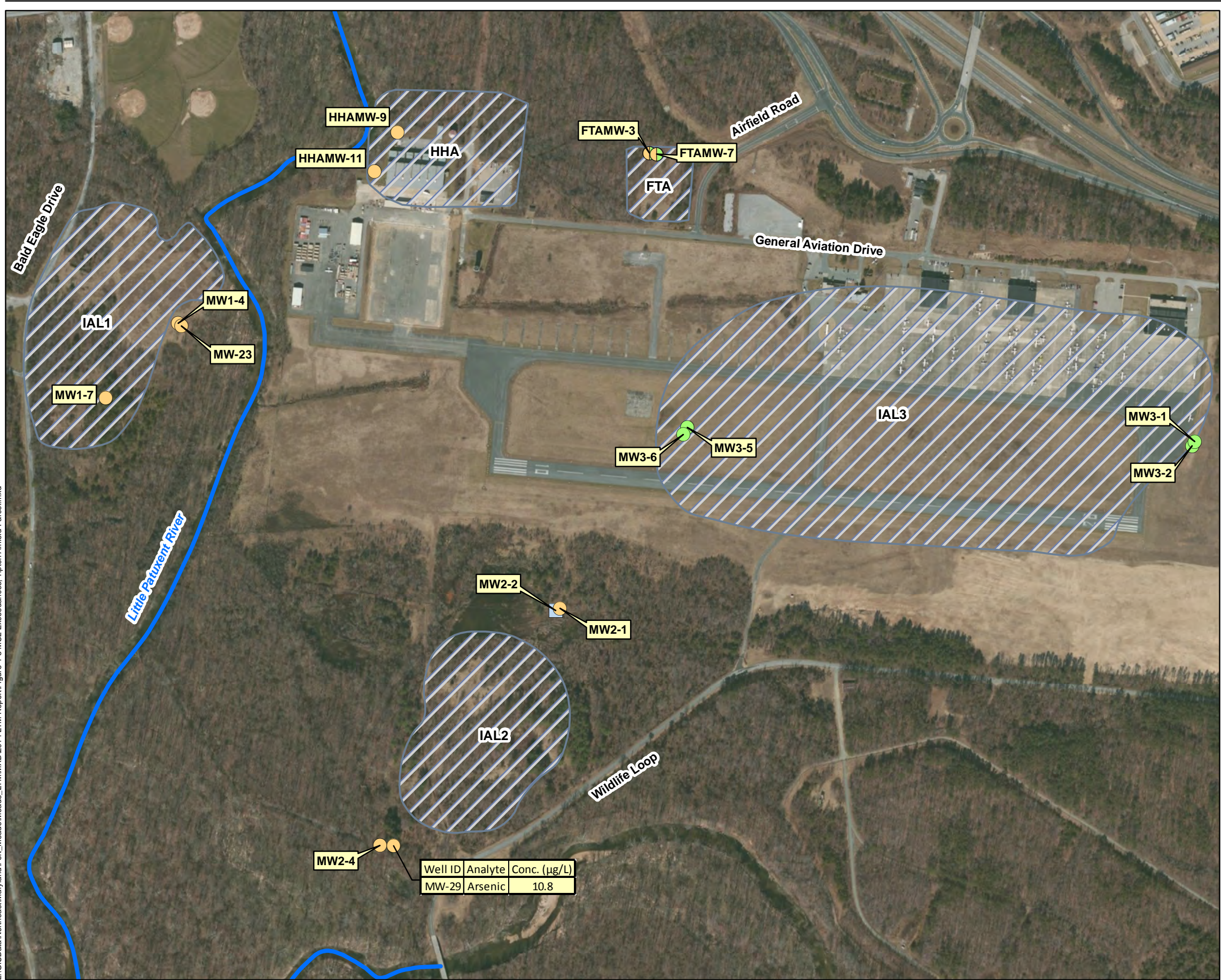
L:\GISData\Northeast\Maryland\Fort\_Meade\Meade\_LTM\MXD\2014 LTM Report\Figure 4-3 Shallow Groundwater Elevation Contour Map, Tipton Airfield Parcel.mxd











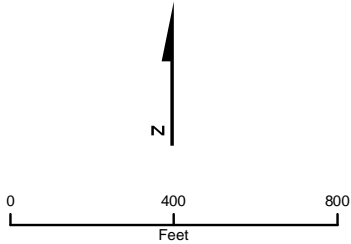
**Legend**

- Aquifer**
- Arundel Clay
  - Lower Patapsco
  - Lower Patapsco or Arundel
  - Patuxent
  - ~ Waterbody
  - Tipton Airfield Parcel Site

Analyte	MCL (µg/L)
Arsenic	10

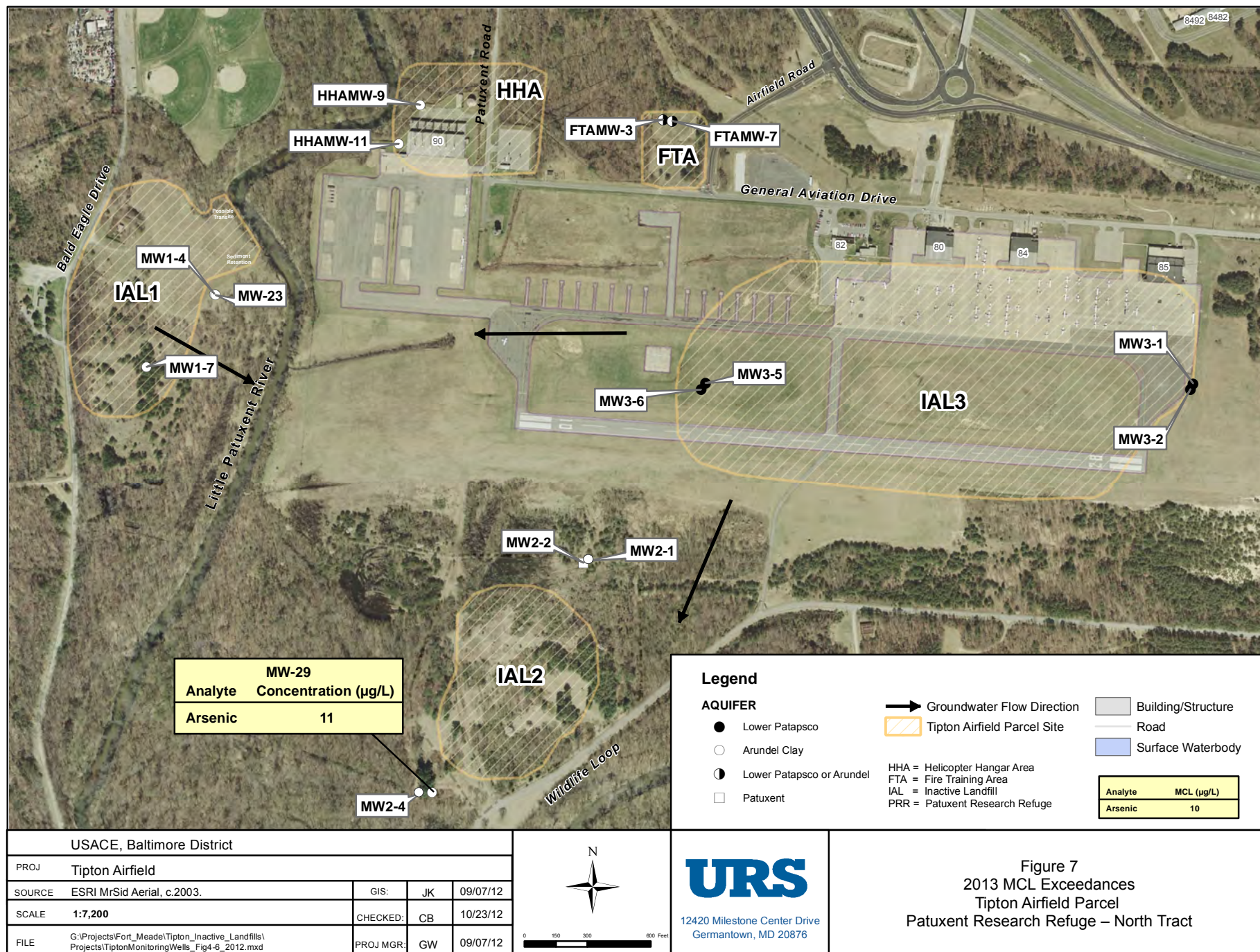
Note:  
 HHA = Helicopter Hangar Area  
 FTA = Fire Training Area  
 IAL = Inactive Landfill

Map Date: April 2015  
 Data Sources: USACE 2010, ESRI 2011

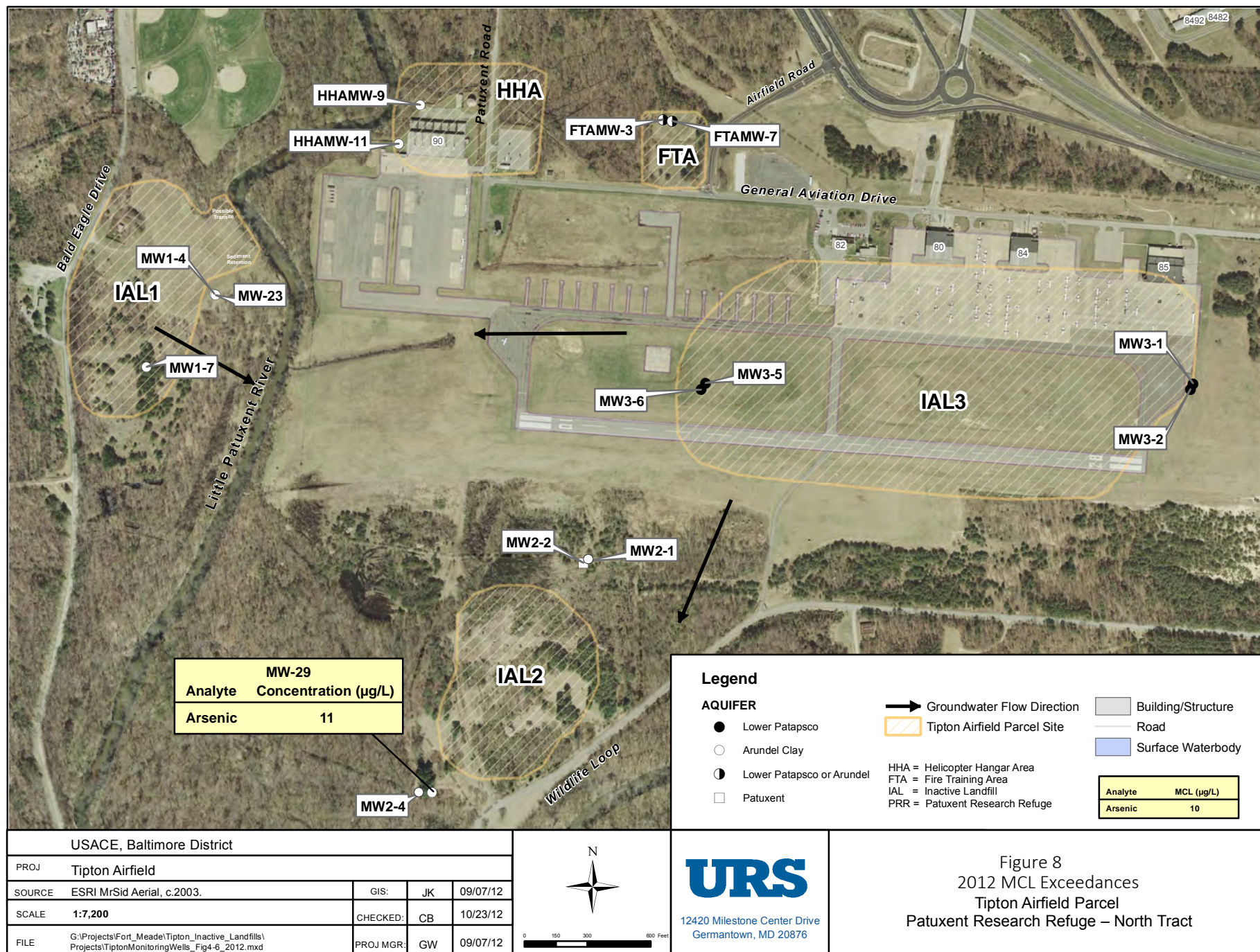


**FIGURE 6**  
**2014 MCL EXCEEDANCES,**  
**TIPTON AIRFIELD PARCEL**  
 Anne Arundel County, Maryland









## **APPENDIX F: TABLES**

## **LIST OF TABLES**

Table F-1	2015 TAP Groundwater Chemical Results (DRAFT)
Table F-2	2014 TAP Groundwater Chemical Results
Table F-3	2013 TAP Groundwater Chemical Results
Table F-4	2012 TAP Groundwater Chemical Results

Table F-1

TAP Groundwater Chemical Results for the 2015 Sampling Event and Screening Criteria

Aquifer/Sample Location Well ID Sample Collection Date Screen Interval (ft bgs) Parent Sample Upgradient/Downgradient						IAL No. 1 (Arundel Clay)			IAL No .2 (Arundel Clay)			IAL No. 3 (Lower Patapsco)		HHA (Arundel Clay)		HHA (Lower Patapsco/Arundel Clay)		
						MW1-4	MW1-7	MW-23	MW2-1	MW2-4	MW-29	MW3-1	MW3-2	HHAMW-9	HHAMW-11	FTAMW-3	FTAMW-7	TAP-GW-DUP1
						6/26/2015	6/26/2015	6/26/2015	6/29/2015	6/26/2015	6/26/2015	6/29/2015	6/29/2015	6/29/2015	6/29/2015	6/29/2015	6/29/2015	6/29/2015
						115-125	7-12	5-20	6-16	164.5-174.5	10-25	23.5-33.5	96-106	4-14	4.1-14.4	3.5-13.5	2.1-12.1	2.1-12.1
						D	U	D	U	D	D	U	U	D	D	D	U	FTAMW-7 U
Analyte		MCL	MCLG	EPA Tap Water	Unit													
Volatile Organic Compounds																		
1,1,2,2-tetrachloroethane	-	-	0.076	c	µg/L	--	--	--	< 0.200 U	--	--	< 0.400 U	< 0.400 U	< 0.400 U	< 0.400 U	< 0.200 U	< 0.400 U	< 0.400 U
Benzene	5	0	0.45	c	µg/L	--	--	--	< 0.500 U	--	--	< 1.00 U	1.50 J	< 1.00 U	< 1.00 U	< 0.500 U	< 1.00 U	< 1.00 U
Carbon tetrachloride	5	0	0.45	c	µg/L	--	--	--	< 0.500 U	--	--	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 0.500 U	< 1.00 U	< 1.00 U
cis-1,2-dichloroethene	70	70	36	n	µg/L	--	--	--	< 0.500 U	--	--	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 0.500 U	< 1.00 U	< 1.00 U
Vinyl chloride	2	0	0.019	c	µg/L	--	--	--	< 0.500 U	--	--	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 0.500 U	< 1.00 U	< 1.00 U
Polynuclear Aromatic Hydrocarbons																		
Naphthalene	-	-	0.17	c	µg/L	--	--	--	--	--	--	--	--	--	--	< 0.0962 U	< 0.0943 U	< 0.0926 U
Dissolved Metals																		
Arsenic	10	0	0.052	c	µg/L	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	9.4	--	--	< 1.50 U	1.86 J	< 1.50 U	< 1.50 U	0.808 J
Iron	-	-	14000	n	µg/L	8.26 J	9,92 J	12300	< 15.0 U	596	43500	--	--	312	64300	464	1170	1120
Manganese	-	-	430	n	µg/L	1.44 J	11.5	1910	25.3	51.2	1420	--	--	31.3	2090	223	267	258
NOTES: Gray shaded results exceed the Tap water RSL in the absence of MCLs. - = Data not available. -- = Sample not tested for. ft = Foot (feet). bgs = Below ground surface. µg/L = Microgram per liter. MCL = EPA Maximum Contaminant Level, June 2015. MCLG = EPA Maximum Contaminant Level Goal, June 2015. EPA Tap = EPA Regional Screening Levels, June 2015. c = Cancer. n = Non-cancer. J = Estimated. U = Not detected.at the Limit of Detection																		



Table F-2  
TAP Groundwater Chemical Results for the 2014 Sampling Event and Screening Criteria

Aquifer/Sample Location  Well ID  Sample Collection Date  Screen Interval (ft bgs)  Upgradient/Downgradient					IAL No. 1 (Arundel Clay)			IAL 2 (Patuxent)	IAL No. 2 (Arundel Clay)			IAL No. 3 (Lower Patapsco)		HHA (Arundel Clay)		HHA (Lower Patapsco/Arundel Clay)			
					MW1-4	MW1-7	MW-23	MW2-2	MW2-1	MW2-4	MW-29	MW3-1	MW3-2	HHAMW-9	HHAMW-11	FTAMW-3 Dup	FTAMW-3	FTAMW-7	
					10/30/2014	10/27/2014	10/27/2014	10/30/2014	10/30/2014	11/4/2014	11/4/2014	10/30/2014	10/30/2014	10/27/2014	10/27/2014	10/27/2014	10/27/2014	10/27/2014	
					115-125	7-12	5-20	292-302	6-16	164.5-174.5	10-25	23.5-33.5	96-106	4-14	4.1-14.4	3.5-13.5	3.5-13.5	2.1-12.1	
					D	U	D	U	U	D	D	U	U	D	D	D	D	U	
Analyte	MCL	MCLG	EPA Tap Water RSL	Unit															
Volatile Organic Compounds																			
1,1,2,2-tetrachloroethane	-	-	0.076	c	µg/L	--	--	--	--	< 0.200 U	--	--	< 0.200 U	< 0.200 U	< 0.200 U	< 0.200 U	< 0.200 U	< 0.200 U	
Benzene	5	0	0.45	c	µg/L	--	--	--	--	< 0.500 U	--	--	< 0.500 U	1.70	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	
Carbon tetrachloride	5	0	0.45	c	µg/L	--	--	--	--	< 0.500 U	--	--	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	
cis-1,2-dichloroethene	70	70	36	n	µg/L	--	--	--	--	< 0.500 U	--	--	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	
Vinyl chloride	2	0	0.019	c	µg/L	--	--	--	--	< 0.500 U	--	--	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	
Polynuclear Aromatic Hydrocarbons																			
Naphthalene	-	-	0.17	c	µg/L	--	--	--	--	--	--	--	--	--	--	--	< 0.0980 U	< 0.0926 U	0.489
Dissolved Metals																			
Arsenic	10	0	0.052	c	µg/L	< 1.50 U	< 1.50 U	1.80 J	< 7.50 U	< 1.50 U	< 1.50 U	10.8	--	--	< 1.50 U	1.32 J	< 1.50 U	< 1.50 U	1.08 J
Iron	-	-	14000	n	µg/L	< 15.0 U	2930	28200	< 75.0 U	< 15.0 U	2170	37400	--	--	16200	17400	1200	1250	12600
Manganese	-	-	430	n	µg/L	38.4 J+	371	1740	< 7.50 U	42.5 J+	43.2	1330	--	--	1540	482	1940	1990	308

Notes:  
**Bolded results exceed the MCL.**  
Gray shaded results exceed the Tap water RSL in the absence of MCLs  
- = data not available  
-- = sample not tested for  
ft = feet  
bgs = below ground surface  
mg/l = milligrams per liter  
ug/l = micrograms per liter  
MCL = US EPA Maximum Contaminant Level, Nov 2014  
MCLG = US EPA Maximum Contaminant Level Goal, Nov 2014  
RSL = US EPA Regional Screening Levels, Nov 2014  
c = cancer  
n = non-cancer  
J = estimated  
J+ = estimated; biased high  
U = not detected at the Limit of Detection

Table F-3  
Tipton Airfield Parcel  
Groundwater Chemical Results for 2013 Sampling Event and Screening Criteria

Aquifer/Sample Location	IAL No. 1 (Arundel Clay)						IAL 2 (Patuxent)				IAL No.2 (Arundel Clay)						IAL No.3 (Lower Patapsco)				HHA (Arundel Clay)				HHA (Lower Patapsco/Arundel Clay)						Historical Concentration Range, where available	Laboratory Method Detection Limit	Screening Criteria (µg/L)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Well ID	MW1-4		MW1-7		MW-23		MW2-2		MW2-1		MW2-4		MW-29		MW3-1		MW3-2		HHAMW-9		HHAMW-11		FTAMW-3		FTAMW-3 Dup		FTAMW-7		National Drinking Water Regulations	EPA Tap Water RSL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
Sample Collection Date	7/22/2013		7/19/2013		7/22/2013		7/23/2013		7/22/2013		7/19/2013		7/19/2013		7/24/2013		7/24/2013		7/19/2013		7/22/2013		7/22/2013		7/22/2013		7/24/2013																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
Screen Interval (in ft bgs)	115-125		7-12		5-20		292-302		6-16		164.5-174.5		10-25		23.5-33.5		96-106		4-14		4.1-14.1		3.5-13.5		3.5-13.5		2.1-12.1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
Upgradient/Downgradient (U/D)	D		U		D		U		U		D		D		U		U		D		D		D		D		U																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
Volatile Organic Compounds (µg/L)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

Notes:

- Shaded results indicate exceedance of MCLs
- Shaded results indicate exceedance of RSLs in the absence of MCLs/MCLGs
- = No data available
- = Sample not tested for component
- ft = feet
- bgs = below ground surface
- µg/L = micrograms per liter
- ND = Non Detect, Sample concentration below laboratory Limit of Detection
- Dup = Duplicate
- EPA = U.S. Environmental Protection Agency
- HHA = Helicopter Hanger Area
- IAL = Inactive Landfill
- MCL = National Primary Drinking Water Regulations, Maximum Contaminant Level, EPA, June 2013.
- MCLG = National Primary Drinking Water Regulations, Maximum Contaminant Level Goal, EPA, June 2013.
- RSL = EPA Regional Screening Levels, June 2013.
- ca = Cancer
- n = Non-cancer
- \* = As described in the OSWER memorandum, EPA has now issued an Interim Drinking Water Health Advisory (Interim Health Advisory) for exposure to perchlorate of 15 µg/L in water.

Laboratory Qualifiers/Data Validation:

- B = Not detected substantially above the level reported in laboratory or field blanks.
- J = Analyte present, reported value is estimated, concentration is greater than the method detection limit (MDL) but less than the limit of quantification.
- L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- UJ = Not detected, quantitation limit may be inaccurate or imprecise.
- LQ = Laboratory Qualifier
- RC = Reason Code (Validation)
- VF = Validation Flag
- c = Calibration failure; poor or unstable response
- r = Linearity failure in initial calibration
- x = Field blank contamination

Table F-4  
Tipton Airfield Parcel  
Groundwater Chemical Results for 2012 Sampling Event and Screening Criteria

Aquifer/Sample Location	IAL No. 1 (Arundel Clay)			IAL 2 (Patuxent)	IAL No.2 (Arundel Clay)				IAL No.3 (Lower Patapsco)				HHA (Arundel Clay)			HHA (Lower Patapsco/Arundel Clay)		Historical Concentration Range, where available	Laboratory Method Detection Limit	Screening Criteria (µg/L)				
Well ID	MW1-4	MW1-7	MW-23	MW2-2	MW2-1	MW2-1Dup	MW2-4	MW-29	MW3-1	MW3-2	MW3-5	MW3-6	HHAMW-9	HHAMW-9Dup	HHAMW-11	FTAMW-3	FTAMW-7			National Drinking Water Regulations	EPA Tap Water			
Sample Collection Date	6/7/2012	6/7/2012	6/7/2012	6/13/2012	6/11/2012	6/11/2012	6/8/2012	6/8/2012	6/8/2012	6/8/2012	6/11/2012	6/11/2012	6/8/2012	6/8/2012	6/8/2012	6/11/2012	6/8/2012			MCL	MCLG			
Screen Interval (in ft bgs)	115-125	7-12	5-20	292-302	6-16	6-16	164.5-174.5	10-25	23.5-33.5	96-106	82-92	15-25	4-14	4-14	4.1-14.1	3.5-13.5	2.1-12.1							
Upgradient/Downgradient (U/D)	D	U	D	U	U	U	D	D	U	U	D	D	D	D	D	D	U							
	LQ	VF	RC	LQ	VF	RC	LQ	VF	RC	LQ	VF	RC	LQ	VF	RC	LQ	VF	RC	LQ	VF	RC			
Volatile Organic Compounds (µg/L)																								
1,1,2,2- TETRACHLOROETHANE	--	--	--	ND	ND	ND	--	--	ND	ND	--	--	ND	ND	ND	ND	ND	ND - 2.5	0.16	-	-	0.066	c	
BENZENE	--	--	--	0.12 J	ND	ND	--	--	ND	1.5	--	--	ND	ND	ND	ND	0.08 J	ND - 12.8	0.062	5	0	0.39	c	
CARBON TETRACHLORIDE	--	--	--	ND	ND	ND	--	--	ND	ND	--	--	ND	ND	ND	ND	ND	ND - 2.4	0.2	5	0	0.39	c	
CIS-1,2-DICHLOROETHENE	--	--	--	ND	ND	ND	--	--	ND	0.17 J	--	--	ND	ND	0.07 J	ND	ND	-	0.067	70	70	28	n	
VINYL CHLORIDE	--	--	--	0.1	ND	ND	--	--	ND	0.08 J	--	--	ND	ND	ND	ND	ND	-	0.075	2	0	0.015	c	
Polynuclear Aromatic Hydrocarbons (µg/L)																								
NAPHTHALENE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.19 X	0.31	ND - 10	0.003	-	0	0.14	c	
Energetics (µg/L)																								
PERCHLORATE	--	--	--	--	--	--	--	--	--	--	ND	0.14 J	--	--	--	--	--	-	0.026	15*	0	11	n	
Total Metals (µg/L)																								
ARSENIC	ND	ND	1.6 J	0.7	0.1 J	ND	1.9	11	--	--	--	--	2.3 J	1.9	2	0.7	1.6	ND - 19	0.1	10	0	0.045	c	
IRON	749	294	33,000	34.7	ND	12.1 J	22,100	38,100	--	--	--	--	28,300	28,500	52,000	2,280	17,800	ND - 61,000	3	-	-	11,000	n	
MANGANESE	69.6	1,180	1,910	0.378	51.3	58	46.5	1,570	--	--	--	--	1,990	2,000	1,460	1,470	845	ND - 3,090	0.2	-	-	320	n	

Notes:

Shaded results indicate exceedance of MCL's

Shaded results indicate exceedance of RSLs in the absence of MCLs/MCLGs

Screening values = MCLs/MCLGs and RSLs as stated in the TAP ESD (URS, 2012).

-- = No data available

-- = Sample not tested for component

ft = feet

bgs = below ground surface

µg/L = micrograms per liter

ND = Non Detect, Sample concentration below laboratory Limit of Detection

Dup = Duplicate

EPA = U.S. Environmental Protection Agency

HHA = Helicopter Hanger Area

IAL = Inactive Landfill

MCL = National Primary Drinking Water Regulations, Maximum Contaminant Level, EPA, June 2012.

MCLG = National Primary Drinking Water Regulations, Maximum Contaminant Level Goal, EPA, June 2012

RSL = EPA Regional Screening Levels, May 2012.

c = Cancer

n = Non-cancer

\* = As described in the OSWER memorandum, EPA has now issued an Interim Drinking Water Health Advisory (Interim Health Advisory) for exposure to perchlorate of 15 µg/L in water

Laboratory Qualifiers/Data Validation:

J = Analyte present, reported value is estimated, concentration is greater than the method detection limit (MDL) but less than the limit of quantification.

X = Slight high bias concentration

LQ = Laboratory Qualifier

RC = Reason Code (Validation)

VF = Validation Flag

